

Upper/Mid-Sacramento River Region

Regional Flood Atlas–Draft

REGIONAL FLOOD
MANAGEMENT PLANNING



May 2013



Regional Flood Management Planning

The California Department of Water Resources (DWR) has launched the Regional Flood Management Planning effort to work with local entities to collect on-the-ground information and to use existing technical studies to formulate feasible projects, assess the performance of the projects, and develop a plan that reflects the vision of local entities in reducing flood risks in their region. DWR plans to provide guidance, as well as technical and financial assistance, to local agencies to prepare regional flood management plans that formulate and prioritize the proposed projects in each region. Regional Flood Management Planning is an important first step in refining and implementing the 2012 Central Valley Flood Protection Plan.

Though the 2012 CVFPP identifies nine regions (Upper Sacramento, Mid-Sacramento, Feather River, Lower Sacramento, Delta-North, Delta-South, Lower San Joaquin, Mid-San Joaquin, and Upper San Joaquin), the majority of the regions have partnered together, resulting in six regions. These six regions are the Upper/Mid-Sacramento River, Feather River, Lower Sacramento River/Delta North, Lower San Joaquin River/Delta South, Mid-San Joaquin River, and Upper San Joaquin River.

Each of the six planning regions has formed a working group that is led by a local agency and consists of representatives from flood management agencies, land use agencies, flood emergency responders, permitting agencies, and environmental and agricultural interests. The regional plans will present local agencies’ perspectives of flood management with a prioritized list of projects that need to be implemented to reduce flood risks in each region. Each plan will also present an assessment of the proposed project costs and benefits, considering potential contributions to an integrated and basin-wide solution.

Regional Flood Atlas

During the development of the 2012 Central Valley Flood Protection Plan (CVFPP) the areas protected by the facilities of the State Plan of Flood Control (SPFC) were organized into flood planning regions to account for the variations in land use conditions, flood protection facilities, and flood hazards. Through the regional planning process, FloodSAFE will work with local partners to identify and prioritize proposed regional flood system improvements for each of the six flood planning regions.

This Regional Flood Atlas is primarily graphic depictions of the flood risk characteristics and hazards of the region. The Regional Flood Atlas was compiled from existing data to share understanding and to facilitate discussions about the “current state” of flood risks in the region. The Regional Flood Atlas is a compilation of several ongoing efforts within DWR. The information in the Regional Flood Atlases is a snapshot of those on-going efforts. The Atlas is not intended to serve as a comprehensive environmental setting section under CEQA or NEPA.

During the course of the regional planning effort, additional regional information will be gathered from local agencies to more fully identify the regional flood risk. New information obtained through these meetings and workshops will be used to update the Regional Flood Atlases. When complete, the Final Regional Flood Atlases will be appended to the Draft and Final Regional Plans.

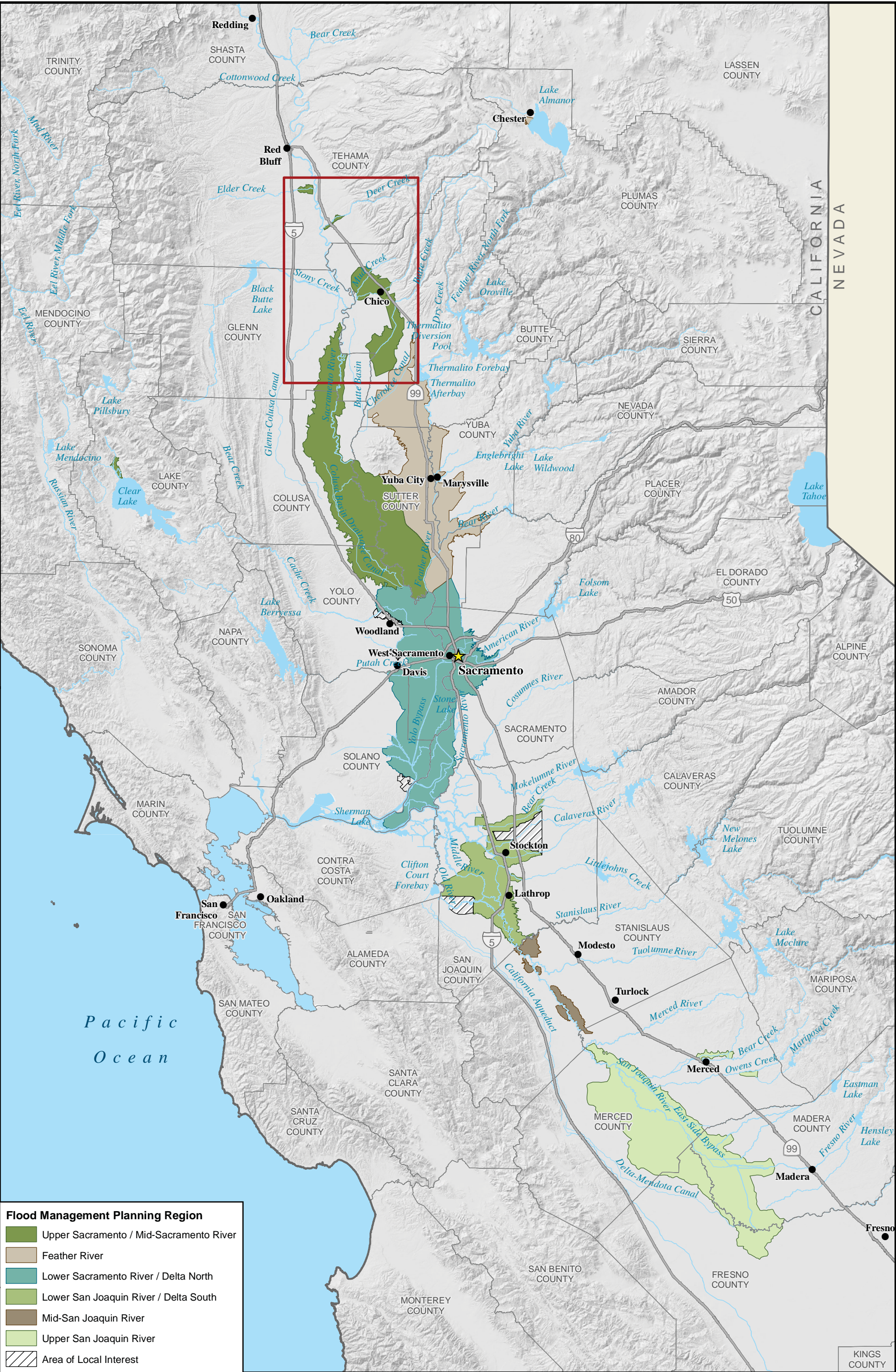
The Upper Sacramento River Region includes areas protected by SPFC levees (project levees) near the Sacramento River upstream of the Butte Basin. This region is located north of the contiguous project levees. This region’s land use is primarily rural except for the urban area that includes the City of Chico.



The following list of maps has been identified for inclusion in the Upper Sacramento River Regional Flood Atlas:

- Map 1 Regional Overview – This map identifies the boundaries and map extent for the Region.
- Map 2 Protected Populations and Assets – This map identifies the distribution of protected populations and assets in the Central Valley.
- Map 3 Levee Flood Protection Zones –This map shows areas within the Region protected by the facilities of the SPFC.
- Map 4 Local Jurisdictions – This map shows the city and county boundaries and will be used to identify the local land use planning authority in order to identify the appropriate land use-based roles and responsibilities.
- Map 5 DWR Integrated Regional Water Management Planning Areas – This map identifies the DWR Integrated Regional Water Management Planning Regions that coincide with the Flood Planning Region.
- Map 6 General Land Use – This map identifies general land uses, including agricultural, urban and native vegetation. This information will be used to identify flood risks of current and future development in the floodplains.
- Map 7 Local Maintaining Agencies – This map identifies the LMA boundaries within the Region.
- Map 8 Existing Critical Facilities and Economic Assets – This map identifies highways, primary county roads, railroads, bridges, airports, docks/marinas, hospitals, police stations, firehouses, and schools.
- Map 9 SPFC and Local Flood Control Facilities – This map identifies the SPFC and Non-SPFC flood control facilities (levees, weirs, pump stations, canals) that provide flood protection. This information will be used to identify and locate all flood facilities in the Region.
- Map 10 Flood Emergency Response Facilities – This map identifies facilities that may be used to support emergency response readiness.
- Map 11 Overall Levee Conditions – This map includes the results of inspection reports, Non-Urban Levee Evaluations/Urban Levee Evaluations, and other known/identified deficiencies or areas of poor past performance.
- Map 12 Seepage Past Performance Problems – This map includes the results from Flood System Repair Program/Urban Levee Evaluations, showing areas which have experienced seepage issues.
- Map 13 Slope Instability Past Performance Problems – This map includes the results from Flood System Repair Program/Urban Levee Evaluations, showing areas which have experienced slope instability issues.
- Map 14 Erosion Past Performance Problems – This map includes the results from Flood System Repair Program/Urban Levee Evaluations, showing areas which have experienced erosion issues.
- Map 15 Other Past Performance Problems – This map includes the results from Flood System Repair Program/Urban Levee Evaluations, showing areas which have experienced a variety of issues including breaches and overtopping.
- Map 16 FEMA 100-Year Floodplain – This map identifies the 100-year flood inundation areas from the FEMA 100-year floodplain.
- Map 17 Channel Capacities and Flood Forecast Monitoring Network –This map identifies the current channel capacities of the SPFC. This information will be used to identify the floodways and their capacities within the region.
- Map 18 Managed Environmental Lands – This map identifies the wildlife refuge areas and critical habitat areas. This information will be used to map ecologically sensitive areas within the region.
- Map 19 Riparian Vegetation, Critical Habitat, and Endangered and Threatened Species – This map identifies riparian vegetation along the rivers and streams affected by the SPFC facilities, and the presence of Critical Habitat or Endangered and Threatened Species within the region.

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Flood Management Planning Region

- Upper Sacramento / Mid-Sacramento River
- Feather River
- Lower Sacramento River / Delta North
- Lower San Joaquin River / Delta South
- Mid-San Joaquin River
- Upper San Joaquin River
- Area of Local Interest

1" = 20 miles

0 5 10 20 Miles

Datum: NAD 83 Projection: CA (Teale) Albers
Zone: N/A Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

**Upper Sacramento River
Regional Overview**

DRAFT

FloodSAFE
CALIFORNIA

DEPARTMENT OF WATER RESOURCES
STATE OF CALIFORNIA

Prepared By: K. Miller
Date: May 10, 2013

MAP 1A

File: Z:\Projects\109146\Map01_Overview.mxd

Regional Flood Management Planning

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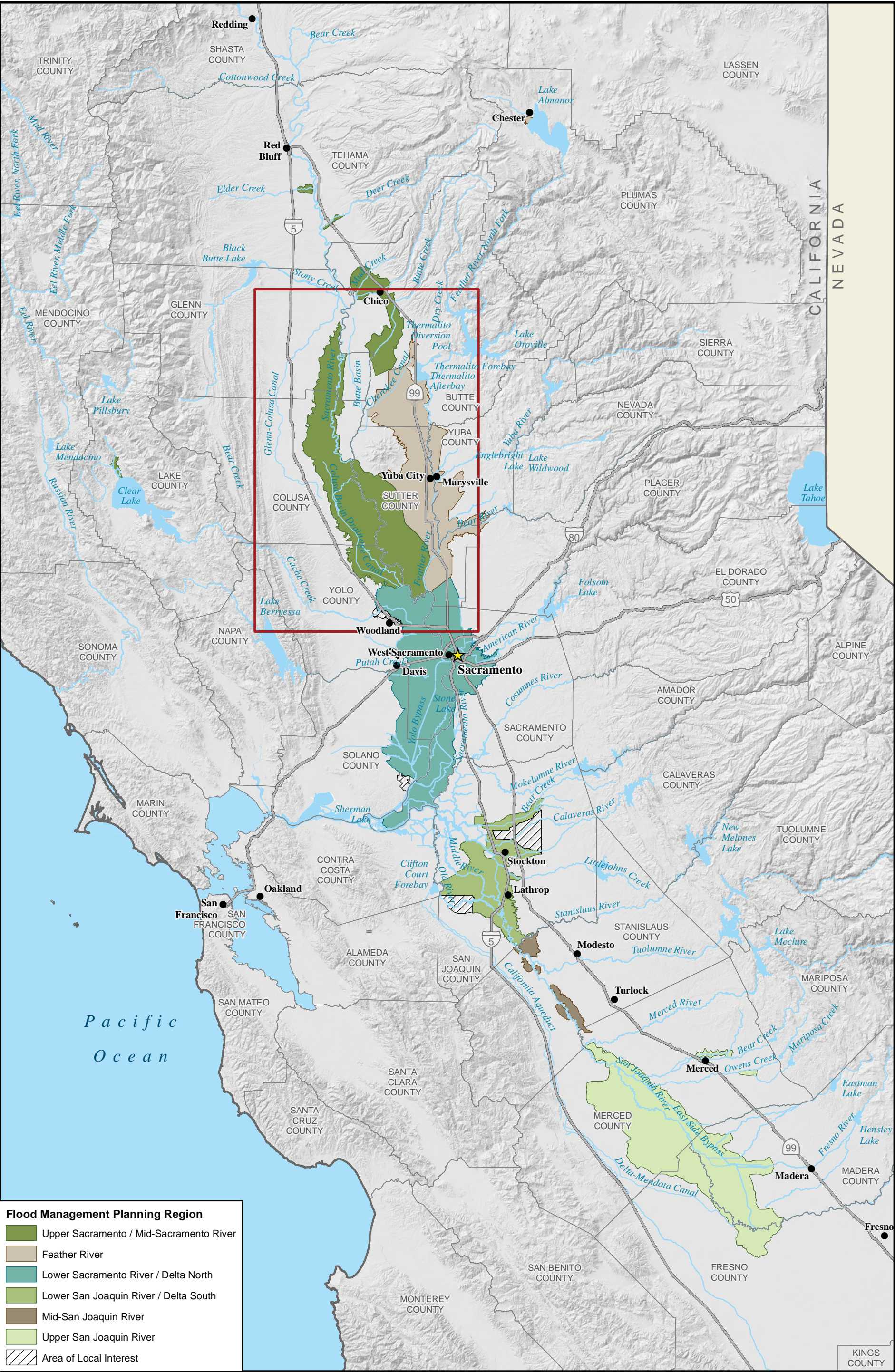
The Mid-Sacramento River Region includes the area protected by SPFC levees (project levees) near the Sacramento River above Freemont Weir. This region’s land use is primarily rural except for the urban area which includes the City of Colusa.



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Datum: NAD 83 Projection: CA (Teale) Albers
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Regional Flood Management Planning

**Mid-Sacramento River
Regional Overview**

DRAFT

FloodSAFE
CALIFORNIA
DEPARTMENT OF WATER RESOURCES
STATE OF CALIFORNIA

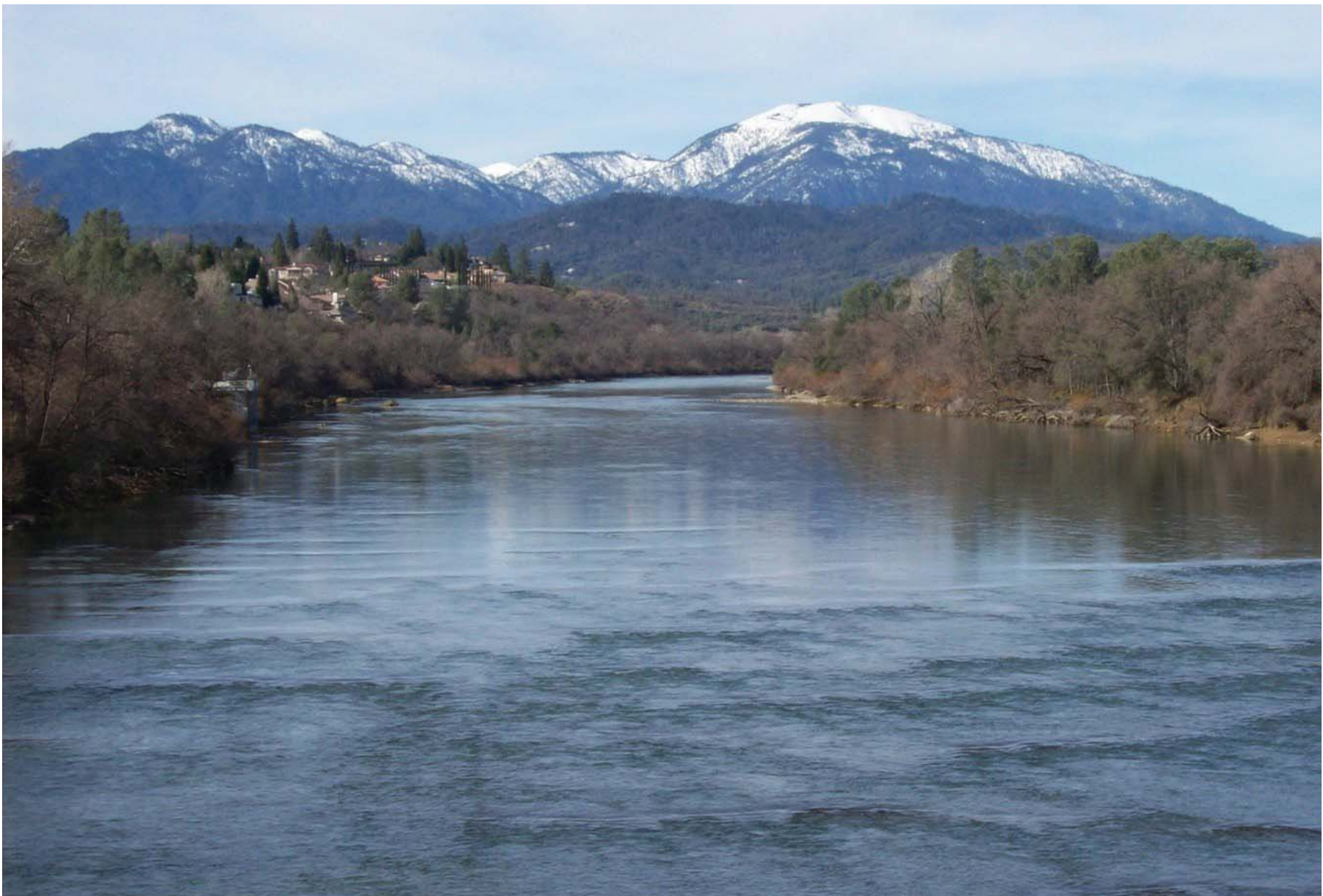
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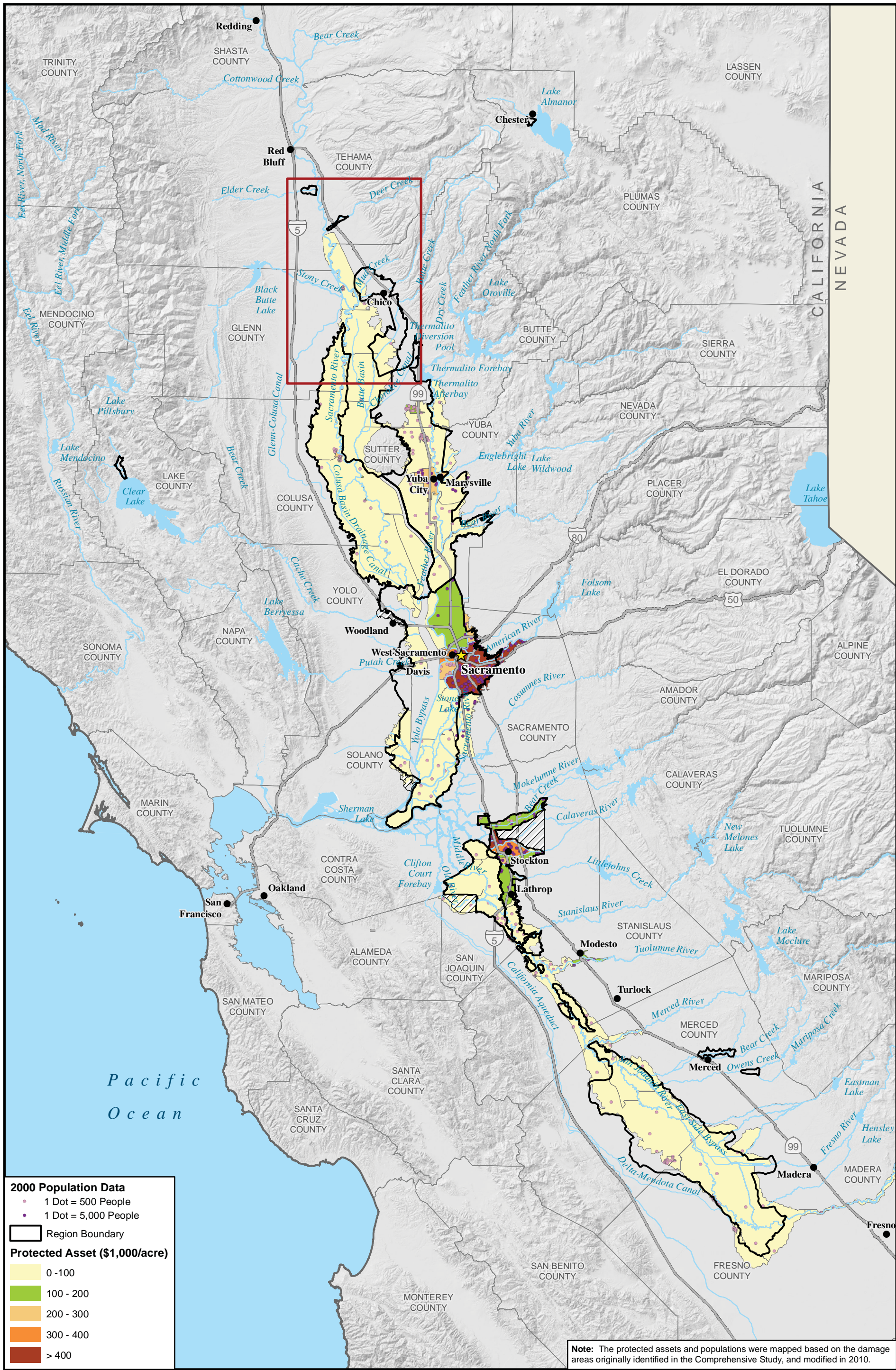
MAP 1B

Map 2A – Protected Populations and Assets

Over the last century, the Central Valley has experienced intensive development to meet the needs of a growing population. A complex water supply and flood risk management system supports and protects a vibrant agricultural economy, several cities, and numerous small communities. The SPFC protects a population of over one million people,

major freeways, railroads, airports, water supply systems, utilities, and other infrastructure of statewide importance, including \$69 billion in assets (includes structural and content value and estimated annual crop production values). Many of the more than 500 species of native plants and wildlife found in the Central Valley rely, to some extent, on habitat existing within the SPFC.



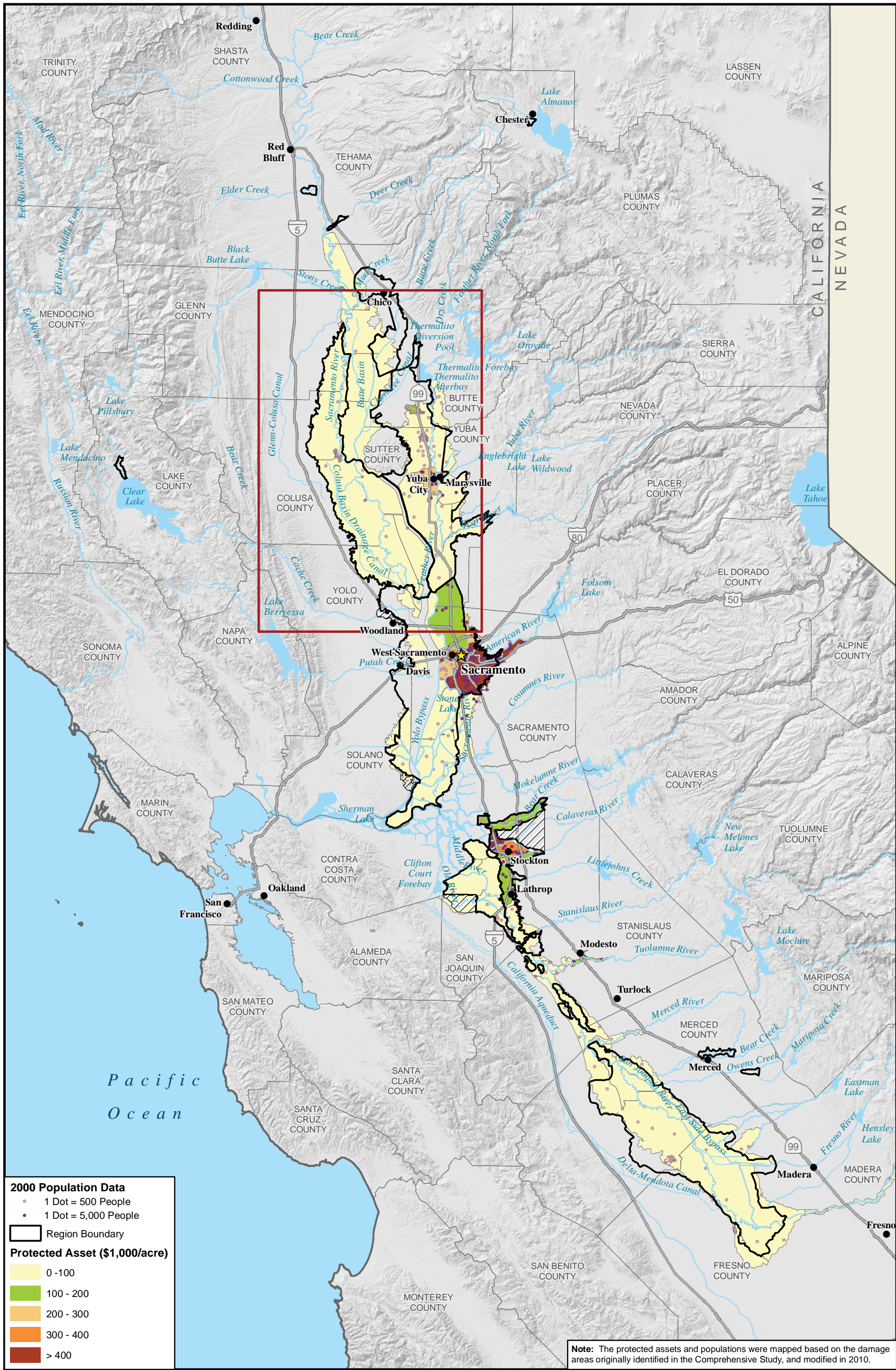


Map 2B – Protected Populations and Assets

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Map 3A – Levee Flood Protection Zones

Each flood planning region is composed of numerous Levee Flood Protection Zones (LFPZs). Assembly Bill No. 156 (AB156) defines a Levee Flood Protection Zone as the area that receives protection from a levee that is part of the facilities of the State Plan of Flood Control. AB 156 requires the development of the maps that delineate LFPZs using the best available existing information. The LFPZ are intended to show areas protected by project levees at or below design flow, but the LFPZs are not synonymous with a level of protection and should not be construed as such. The Department of Water Resources’ Central Valley Floodplain Evaluation and Delineation Program published the initial LFPZs in December 2008.

The LFPZs are generally separated into two groups:

- LFPZ areas subject to flooding from ponding areas with depths greater than three feet. These areas are typically surrounded by levees, so the lateral extent of flooding can be identified. These areas are shown in orange on the published LFPZ maps.
- LFPZ areas subject to flooding from channel or overland flow resulting in unknown flood depths. These areas are not entirely surrounded by levees, so the LFPZ boundaries are thus approximate and should not be considered precise delineations. These areas are shown in yellow on the published LFPZ maps.

LFPZs estimate the maximum area that may be inundated if a project levee fails when the water surface elevation is at the top of a project levee. Zones depicted on this map were created utilizing methods and assumptions described in the LFPZ Map Development Technical Memorandum, and do not necessarily depict areas likely to be protected from flow events for which project levees were designed. The LFPZ Map Development Technical Memorandum was produced by DWR’s Division of Flood Management, Floodplain Risk Management Branch.

Lands within the LFPZs may be subject to flooding due to various factors, including the failure or overtopping of project or non-project levees, flows that exceed the design capacity of project or non-project levees, and flows from water sources not specifically protected against by project levees. Lands not mapped within a LFPZ are not invulnerable to flood risk, and some may also experience flooding from these or other processes.

Upper Sacramento River Flood Planning Region Flood History

The following flood history was compiled from information collected by the Statewide Flood Management Program. The list includes major events beginning in 1955, after substantial completion of flood control infrastructure. Specific information on localized flooding was included where available.

Butte County

1955 Christmas Flood of 1955. Butte Creek was characterized by extremely large flows. The Sacramento River Flood Control Project and other flood management programs were implemented. Levees, dams, reservoirs and waterways controlled flood flows through the Sacramento System. Agricultural lands and local flooding occurred.

1962 Flood and Rainstorms

1964-1965 An estimated 222,500 acres within the valley floor areas of the Sacramento River Basin were flooded. Many cities and towns along the Sacramento River and tributaries were threatened by high water, but suffered minimal flooding.

1967-1968-1969 Winter of 1969. Storms characterized by extremely large flows, including record flows at some locations. The Sacramento River Flood Control Project and other flood management programs were implemented. Levees, dams, reservoirs, and waterways controlled flood flows through the Sacramento System. Agricultural lands and local flooding occurred.

1970 Winter Northern California Flood: Declared Federal 1/26/69.

1974 March. Little Chico Creek flooded. Characterized by extremely large flows, including record flows at some locations. The Sacramento River Flood Control Project and other flood management programs were implemented. Levees, dams, reservoirs and waterways controlled flood flows through the Sacramento System. Agricultural lands and local flooding occurred.

1978 March.

Little Chico Creek flooded.

1982-1983 December through March, located in Keefer Slough/Ruddy Creek flooded. Federal disaster was declared on 2/9/83.

1986 February, Butte Creek/Wyman Ravine/Ruddy Creek flooded. Rains, winds, and mudslides. The flood caused extensive damage to the

flood management system of the Sacramento Valley, and led to a substantial reassessment of and repairs to flood control infrastructure.

1993 February 8 & 9, South portion of Butte County flooded. Heavy rainfall.

1995 January. Severe winter storms caused flooding, landslides, mud flows. Over 100 stations recorded their greatest 1-day rainfall in history. Most of the storms hit the Sacramento River Basin which resulted in small stream flooding due to drainage system failure. Highway 99 flooded for several hours both brought on by El Niño weather conditions. Extremely wet conditions coupled with voluminous Sierra runoff led to very high river stages throughout the system. There was extensive damage to the flood management system of the Sacramento Valley.

1997 January. Butte Creek (State Maintenance Area 5), Palermo, Butte Creek Canyon, Chico flooded. Heavy rains and overflowed creeks.

1998 February. Little Chico Creek flooded. Flood surge resulted in flooding of Alberton Avenue Bridge.

2005 January. Palermo, Rock Creek, Keefer Slough Area flooded. Highway 99 flooded for several hours, caused extensive erosion.

Tehama

1955 The Sacramento River Flood Control Project and other flood management programs were implemented. Levees, dams, reservoirs and waterways controlled flood flows through the Sacramento System. Agricultural lands and local flooding occurred.

1964-1965 Declared Federal 12/29/1964. Abnormally heavy, continuous rainfall and windstorm. An estimated 222,500 acres within the valley floor areas of the Sacramento River Basin were flooded. Many cities and towns along the Sacramento River and tributaries were threatened by high water, but suffered minimal flooding.

1967 The Sacramento River Flood Control Project and other flood management programs were implemented. Levees, dams, reservoirs, and waterways controlled flood flows through the Sacramento System. Agricultural lands and local flooding occurred.

1969 Declared Federal 1/26/69. The Sacramento River Flood Control Project and other flood management programs were implemented. Levees, dams, reservoirs, and waterways controlled flood flows through the Sacramento System. Agricultural lands and local flooding occurred.

1970 Declared Federal 2/16/1970. The Northern California flood of 1970 brought inundation to approximately 550,000 acres, including portions of several small towns.

1974 The Sacramento River Flood Control Project and other flood management programs were implemented. Levees, dams, reservoirs, and waterways controlled flood flows through the Sacramento System. Agricultural lands and local flooding occurred.

1982-1983 Declared Federal 2/9/83. Brought on by El Niño weather conditions, extremely wet conditions coupled with voluminous Sierra runoff led to very high river stages throughout the system. Flooding caused extensive damage to the flood management system of the Sacramento Valley.

1986 Rains, winds, flooding and mudslides caused extensive damage to the flood management system of the Sacramento Valley, and led to a substantial re-assessment of and repairs to flood control infrastructure.

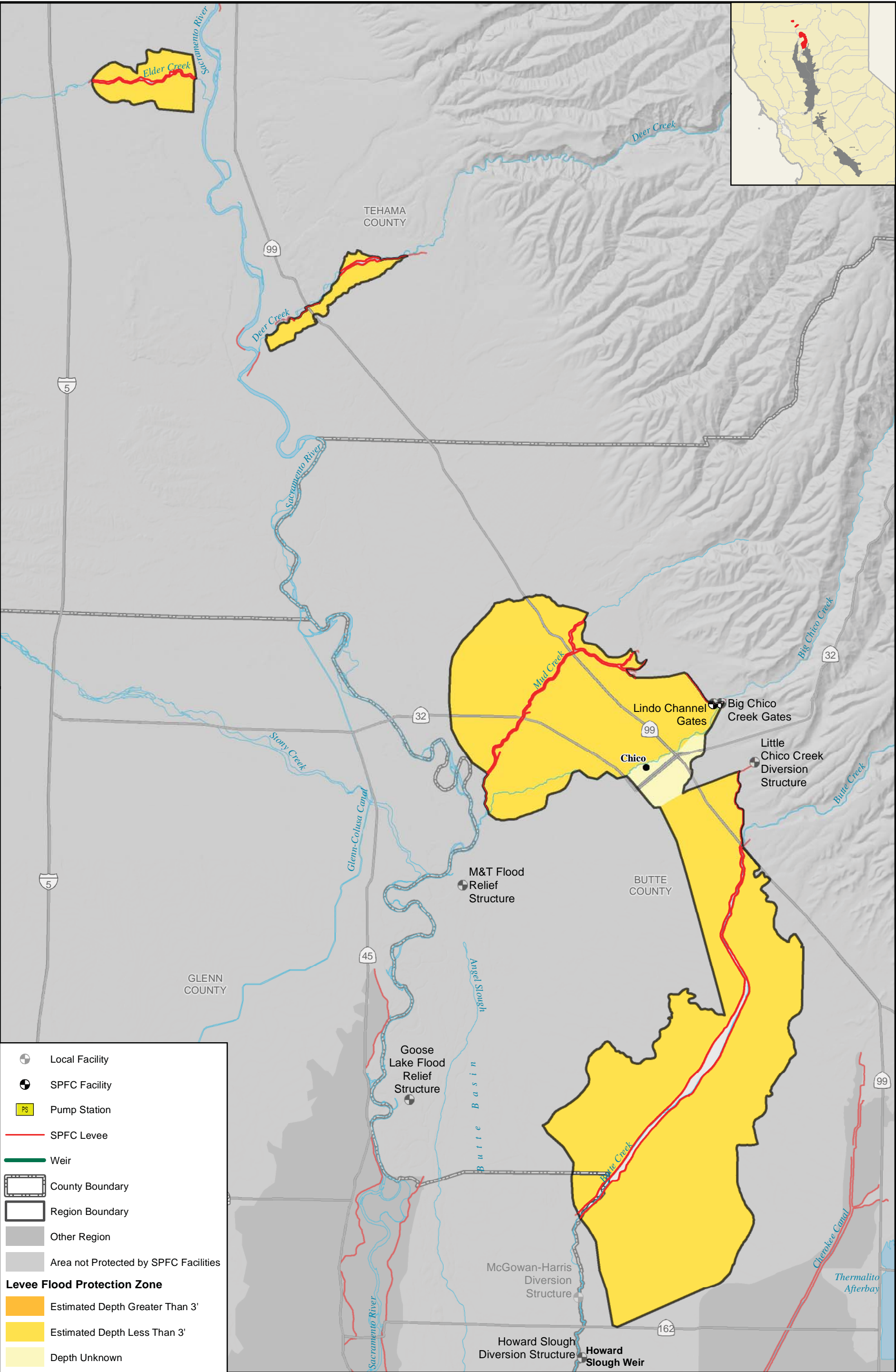
1993 Storm, rain, and high winds.

1995 Severe winter storms, flooding, landslides, mud flows. Over 100 stations recorded their greatest 1-day rainfall in history. Most of the storms hit the Sacramento River Basin which resulted in small stream flooding due to drainage systems failure.

1997 Flash Floods

1998 January 12 & 18. Sacramento River Basin flooding.

2008 October 3 – 4. Pulga, Las Plumas, Big Bend -Flash floods.



1" = 3 miles

0 0.75 1.5 3 Miles

Datum: NAD 83 Projection: CA (Teale) Albers
Zone: N/A Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

Upper Sacramento River

Levee Flood Protection Zones

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FloodSAFE
CALIFORNIA

DEPARTMENT OF WATER RESOURCES
STATE OF CALIFORNIA

Prepared By: K. Miller
Date: May 10, 2013

MAP 3A

File: Z:\Projects\109146\Map03_LFP.mxd

Map 3B – Levee Flood Protection Zones

Each flood planning region is composed of numerous Levee Flood Protection Zones (LFPZs). Assembly Bill No. 156 (AB156) defines a Levee Flood Protection Zone as the area that receives protection from a levee that is part of the facilities of the State Plan of Flood Control. AB 156 requires the development of the maps that delineate LFPZs using the best available existing information. The LFPZ are intended to show areas protected by project levees at or below design flow, but the LFPZs are not synonymous with a level of protection and should not be construed as such. The Department of Water Resources, Central Valley Floodplain Evaluation and Delineation Program published the initial LFPZs in December 2008.

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from water sources not specifically protected against by project levees. Lands not mapped within a LFPZ are not invulnerable to flood risk, and some may also experience flooding from these or other processes.

Flood History—Mid-Sacramento River Region

The following flood history was compiled from the Sutter County, California Multi-Hazard Mitigation Plan May 2007, Historical Reference Document for the State Plan of Flood Control May 15, 2012, and information collected by the Statewide Flood Management Program. The list includes major events beginning in 1955, after substantial completion of flood control infrastructure. Specific information on localized flooding was included where available.

1955 Christmas Floods. A levee break south of Yuba City occurred at about midnight on December 23rd. The initial of surge water spread westerly through Gilsizer Slough to the Sutter Bypass and northerly into Yuba City. Within less than 24 hours, the heart of Sutter County was flooded from the Feather River on the east and south to the Bypass on the west and southwest. To the north, the water spread north of Colusa Avenue (Highway 20) in several areas, including some west of Walton Avenue.

1986 Rains, winds, flooding, and mudslides caused extensive damage to the flood management system of the Sacramento Valley.

Levee slumping in Robbins area.

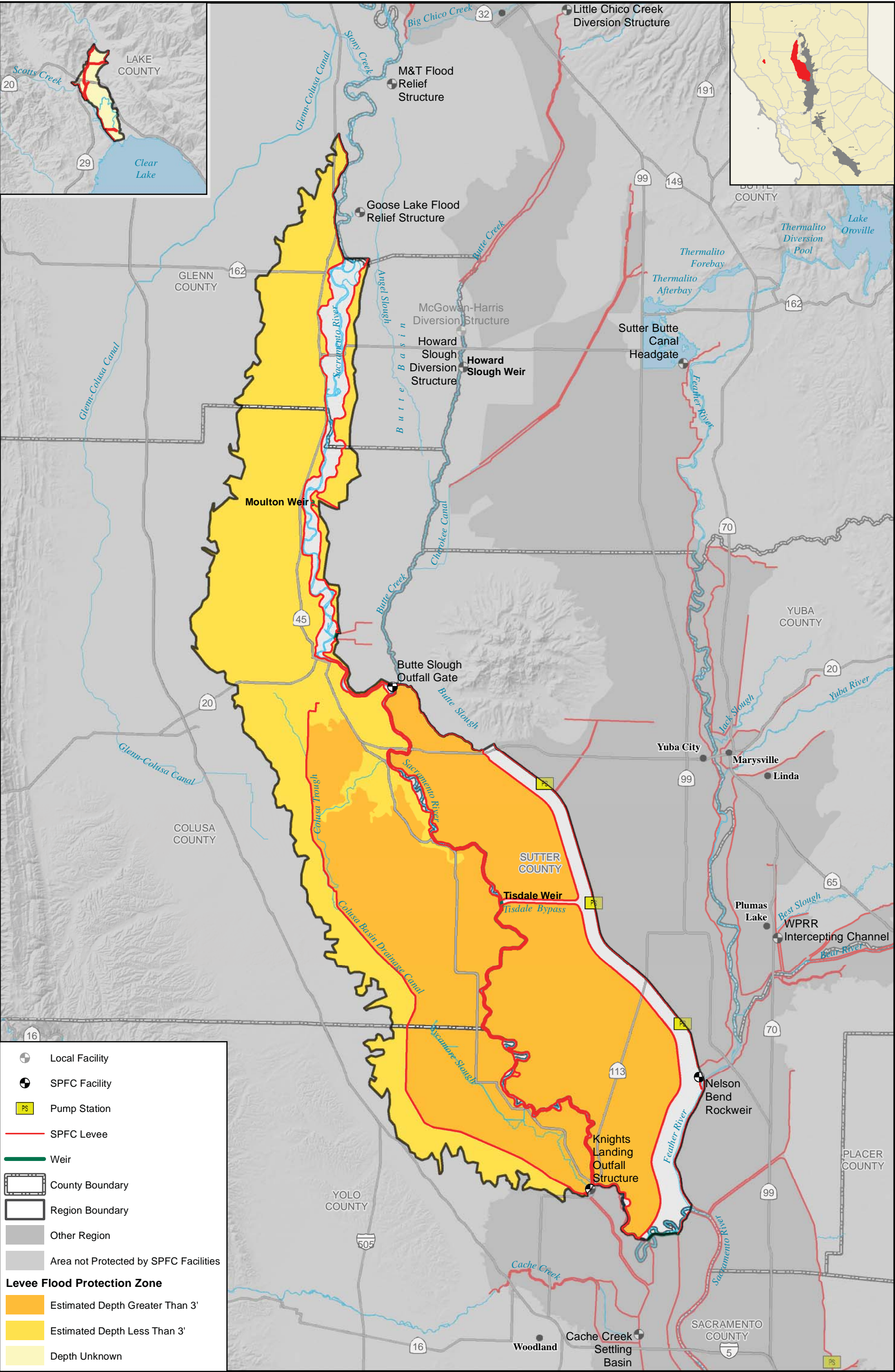
1995 Severe Winter Storms: Severe winter storms, flooding, landslides, mud flows. Over 100 stations recorded their greatest 1-day rainfall in history. Most of the storms hit the Sacramento River Basin which resulted in small stream flooding due to drainage systems failure.

1997 January 1997 Floods. Meridian Basin flooded from a break in the Sutter Bypass.

Several levee breaks were reported across the Sacramento and San Joaquin Valleys.



1958 flood on the Sacramento River, Glenn County



1" = 5 miles

0

1.25

2.5

5

Miles

N

Datum: NAD 83
Zone: N/A
Sources: See Appendix for source citations

Projection: CA (Teale) Albers
Units: meters

Regional Flood Management Planning

Mid-Sacramento River
Levee Flood Protection Zones

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CALIFORNIA

DEPARTMENT OF
WATER RESOURCES

Prepared By: K. Miller
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MAP 3B

Map 4A – Local Jurisdictions

The Jurisdictions Map provides the boundaries for cities, counties, and tribes located within or near the flood management planning region. These entities may provide services related to flood management planning such as: land use regulation and planning, public works engineering and maintenance, and emergency services.

The Upper Sacramento River Region crosses three counties and one city: Butte County, Glenn County, Tehama County and the City of Chico. The incorporated city and county boundaries illustrated on the map were obtained from CALFIRE 2010 (<http://www.fire.ca.gov>). For more details on the flood management planning boundary, please refer to Map 3 and text.

Contact information for these entities can be found in the Directory of Flood Officials published by DWR in September 2011.

Disadvantaged Communities (DAC)

DWR recognizes that disadvantaged communities (DAC) may exist within each region. DACs may be eligible for grants or additional State financial assistance for local flood control efforts. DAC status can be confirmed using the Department of Water Resources, Disadvantaged Community Mapping Tool:

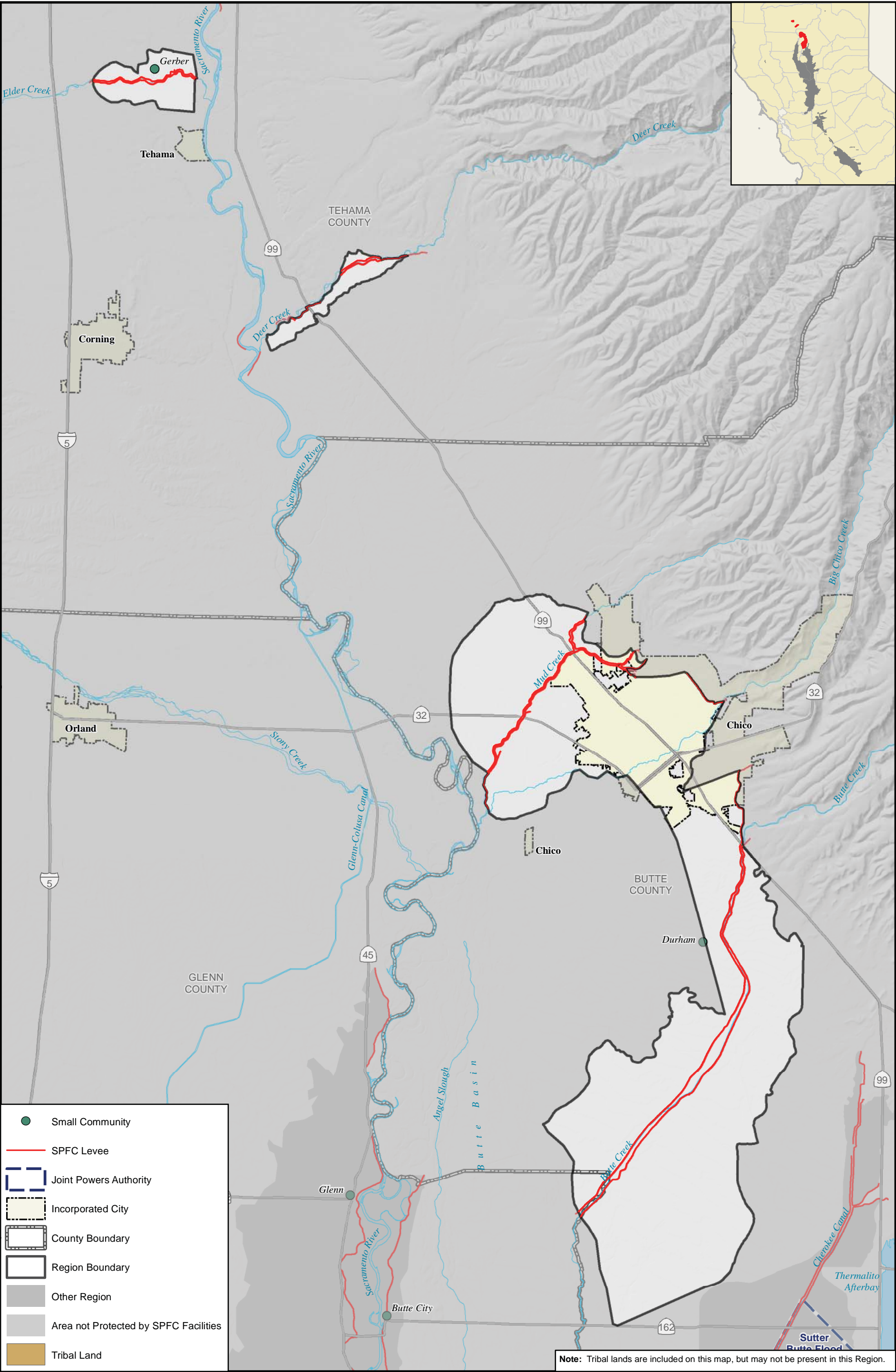
http://www.water.ca.gov/irwm/integregio_resourceslinks.cfm#DAC

Tribal Land Boundaries

The locations of Tribal Land boundaries from the Bureau of Indian Affairs (BIA) were used to determine if tribal lands exist within the Region. Very few of the identified Tribal Lands are located in or adjacent to the Flood Management Regional Areas. Where present, the Tribal names are provided. No tribal lands were identified in this region. <http://www.bia.gov>



Colusa Weir operating during flood conditions, Colusa County



1" = 3 miles

00.751.53

Miles

Datum: NAD 83

Zone: N/A

Sources: See Appendix for source citations

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N

Regional Flood Management Planning

Upper Sacramento River
Local Jurisdictions

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CALIFORNIA

DEPARTMENT OF WATER RESOURCES

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Prepared By: K. Miller

Date: May 10, 2013

File: Z:\Projects\109146\Map04_Jurisdictions.mxd

MAP 4A

DRAFT Upper/Mid-Sacramento River Regional Flood Atlas

15

Map 4B – Local Jurisdictions

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The Mid-Sacramento River Region crosses five counties, one city, and one tribe: Colusa County, Glenn County, Lake County, Sutter County, Yuba County, the City of Colusa, and the Colusa (Cachil Dehe) Rancheria. The incorporated city and county boundaries illustrated on the map were obtained from CALFIRE 2010 (<http://www.fire.ca.gov>). The tribal land boundaries came from the Bureau of Indian Affairs (BIA). For more details on the flood management planning boundary, please refer to Map 3 and text.

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DWR recognizes that disadvantaged communities (DAC) may exist within each region. DACs may be eligible for grants or additional State financial assistance for local flood control efforts. DAC status can be confirmed using the Department of Water Resources, Disadvantaged Community Mapping Tool:

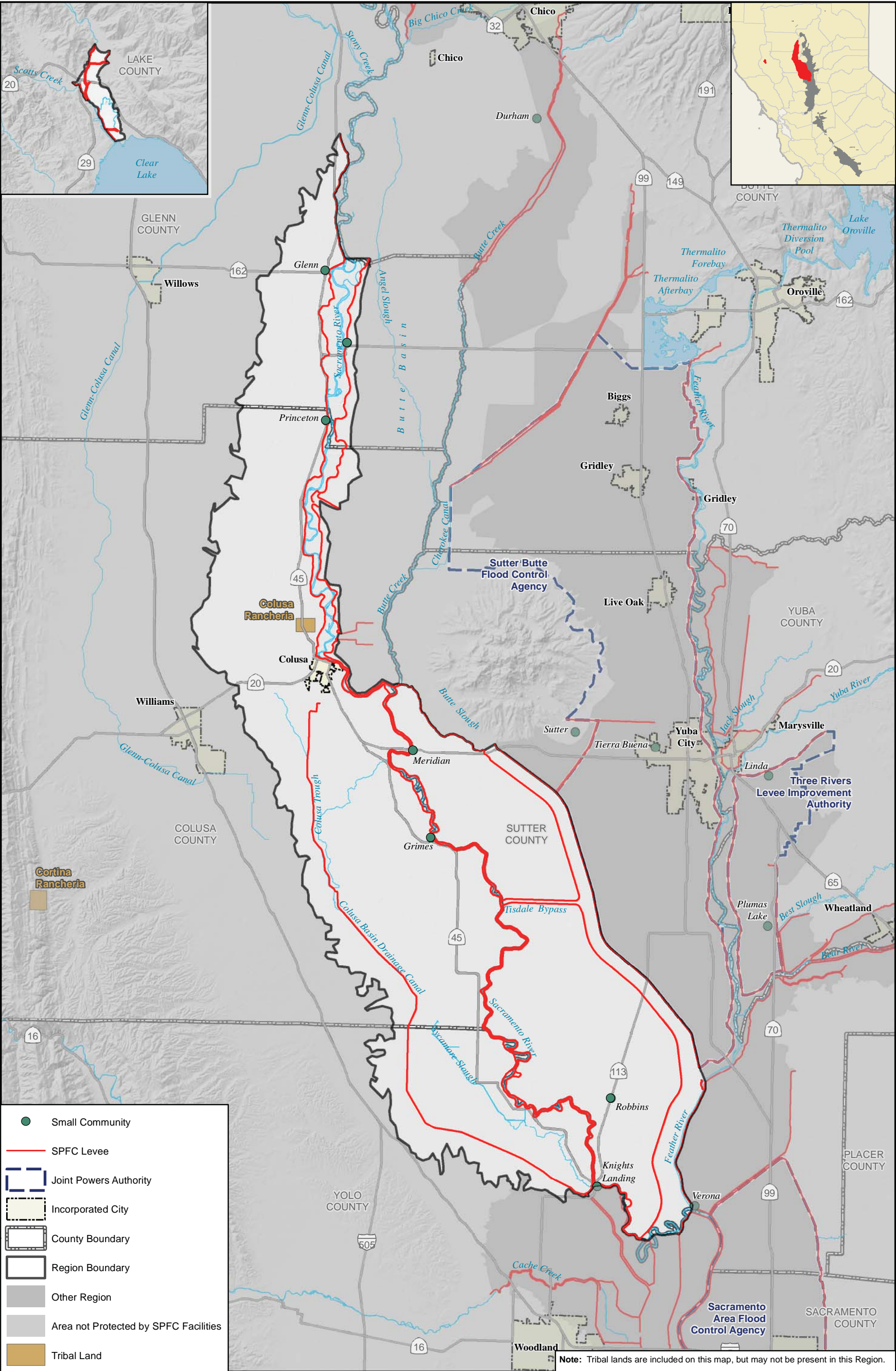
http://www.water.ca.gov/irwm/integregio_resourceslinks.cfm#DAC

Tribal Land Boundaries

The locations of Tribal Land boundaries from the Bureau of Indian Affairs (BIA) were used to determine if tribal lands exist within the Region. Very few of the identified Tribal Lands are located in or adjacent to the Flood Management Regional Areas. Where present, the Tribal names are provided. No tribal lands were identified in this region. <http://www.bia.gov>



Colusa Weir operating during flood conditions, Colusa County



Note: Tribal lands are included on this map, but may not be present in this Region.

1" = 5 miles

0 1.25 2.5 5 Miles

Datum: NAD 83 Projection: CA (Teale) Albers
Zone: N/A Units: meters
Sources: See Appendix for source citations

Regional Flood Management Planning

Mid-Sacramento River

Local Jurisdictions

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Prepared By: K. Miller
Date: May 10, 2013
File: Z:\Projects\109146\Map04_Jurisdictions.mxd

MAP 4B

Map 5A – DWR Integrated Regional Water Management Planning Areas

Integrated Regional Water Management (IRWM) incorporates the physical, environmental, societal, economic, legal, and jurisdictional aspects of water management into regional solutions through a collaborative stakeholder process to promote sustainable water use. IRWM improves water management and helps ensure economic stability, environmental stewardship, public safety and other benefits.

Flood management is a critical component to IRWM. As part of the Regional Flood Management Planning Effort, flood management strategies will be developed for the Flood Management Regions as part of the Regional Plan, and integrated into the IRWM Plans that coincide with the Regional Plan Area. Coordination between Regional Flood Management Planning and the overlying IRWM Planning Areas is encouraged.

Consideration on how efforts by Flood Management Planning will be integrated with ongoing IRWM planning and implementation activities being conducted by IRWM Regional Water Management Groups (RWMGs) will be necessary for assessing and comprehensively addressing water supply, water quality, flood, and ecosystem challenges.

Within the Upper Sacramento River Flood Management Planning Region, the IRWM RWMGs that have been established and are undertaking regional planning and implementation efforts are Northern Sacramento Valley Four County Group.

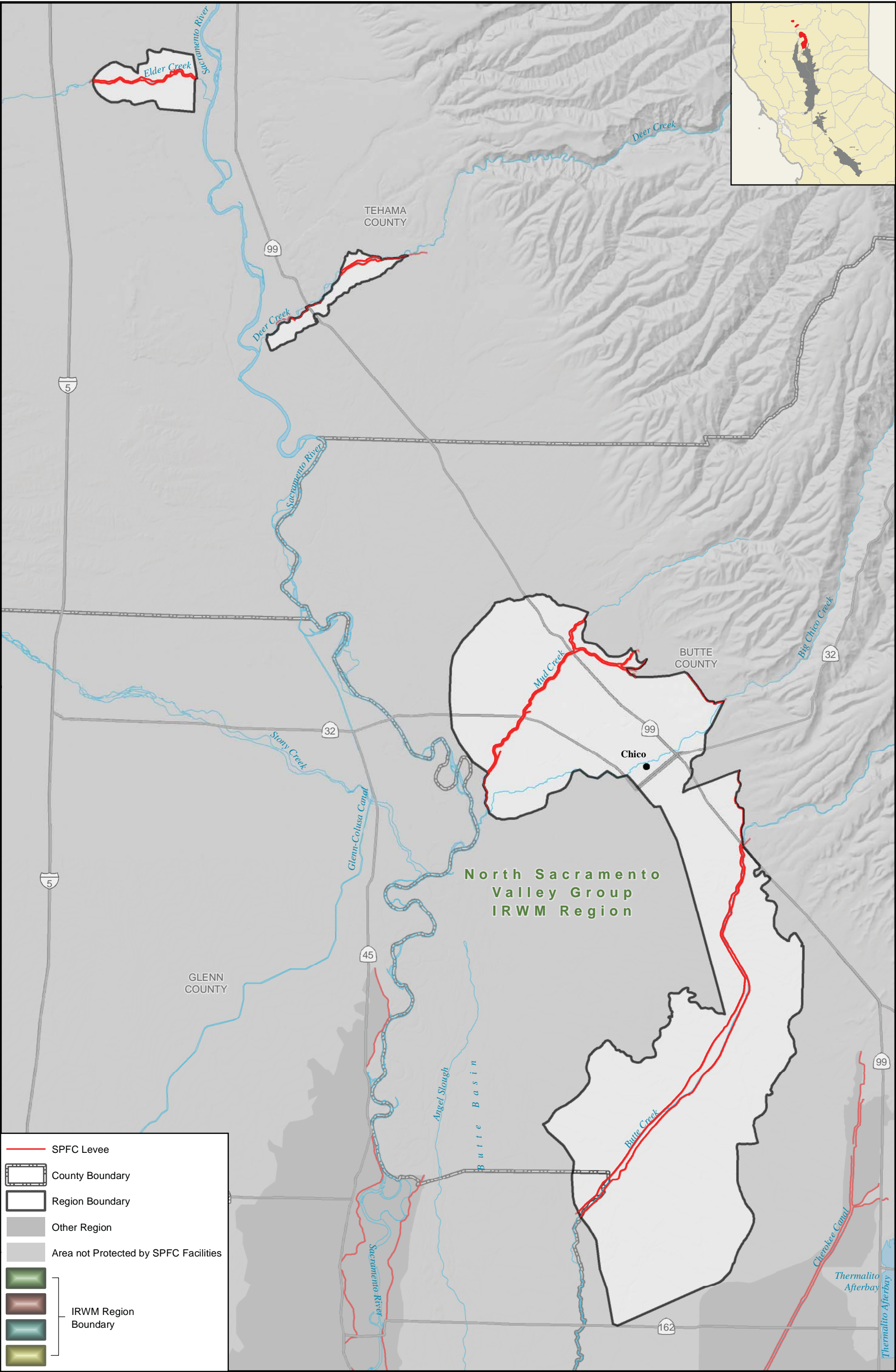
Over the past decade, California has improved its understanding of the value of regional planning and made significant steps in implementing IRWM. Recognizing the current efforts of the IRWM RWMGs and closely coordinating the approach for development of regional flood management plans will be critical for promoting and establishing a regional planning and implementation framework to achieve the goals of water supply reliability and reducing flood risks.



An example of integrated storm water management

Contact Information

IRWM Regions	Agency	Contact	Email	Phone	Agency Website
Northern Sacramento Valley Four County Group	Butte County Water and Resource Conservation	Vickie Newlin	vnewlin@buttecounty.net	(530) 538-2179	http://buttecounty.net/Water%20and%20Resource%20Conservation



1" = 3 miles

0 0.75 1.5 3 Miles

Datum: NAD 83 Projection: CA (Teale) Albers
Zone: N/A Units: meters
Sources: See Appendix for source citations

Regional Flood Management Planning

Upper Sacramento River

DWR Integrated Regional Water Management Planning Areas

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STATE OF CALIFORNIA

Prepared By: K. Miller
Date: May 10, 2013
File: Z:\Projects\109146\Map05_IRWMs.mxd

MAP 5A

Map 5B – DWR Integrated Regional Water Management Planning Areas

Integrated Regional Water Management (IRWM) incorporates the physical, environmental, societal, economic, legal, and jurisdictional aspects of water management into regional solutions through a collaborative stakeholder process to promote sustainable water use. IRWM improves water management and helps ensure economic stability, environmental stewardship, public safety and other benefits.

Flood management is a critical component to IRWM. As part of the Regional Flood Management Planning Effort, flood management strategies will be developed for the Flood Management Regions as part of the Regional Plan, and integrated into the IRWM Plans that coincide with the Regional Plan Area. Coordination between Regional Flood Management Planning and the overlying IRWM Planning Areas is encouraged.

Consideration on how efforts by the Flood Management Planning Region will be integrated with ongoing IRWM planning and implementation activities being conducted by IRWM Regional Water Management Groups (RWMGs) will be necessary for assessing and comprehensively addressing water supply, water quality, flood, and ecosystem challenges.

Within the Mid-Sacramento River Flood Management Planning Region, the IRWM RWMGs that have been established and are undertaking regional planning and implementation efforts are Northern Sacramento Valley Four County Group and Westside (Yolo, Solano, Napa, Lake, Colusa).

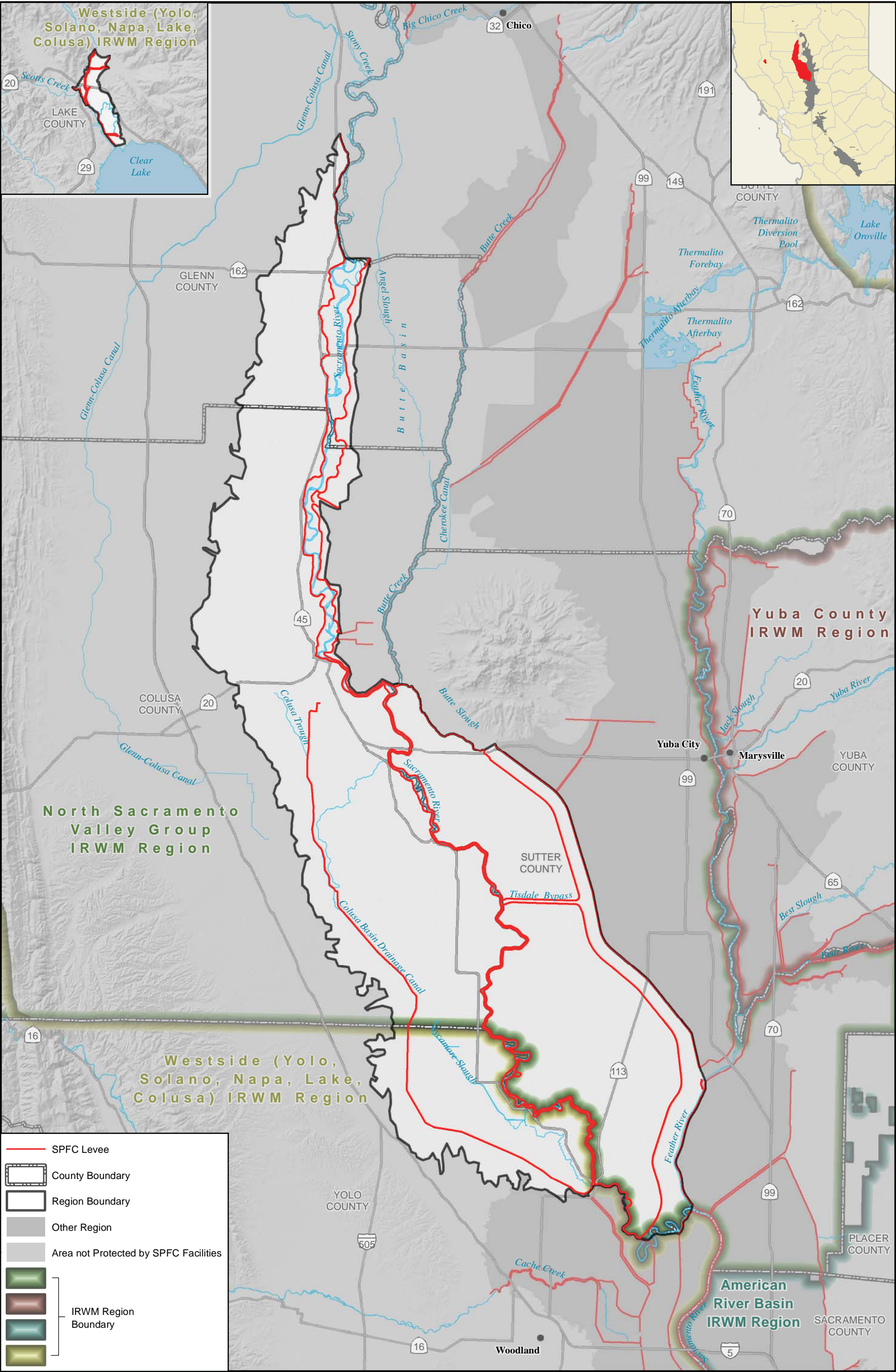
Over the past decade, California has improved its understanding of the value of regional planning and made significant steps in implementing IRWM. Recognizing the current efforts of the IRWM RWMGs and closely coordinating the approach for development of regional flood management plans will be critical for promoting and establishing a regional planning and implementation framework to achieve the goals of water supply reliability and reducing flood risks.



An example of integrated storm water management

Contact Information

IRWM Regions	Agency	Contact	Email	Phone	Agency Website
Northern Sacramento Valley Four County Group	Butte County Water and Resource Conservation	Vickie Newlin	vnewlin@buttecounty.net	(530) 538-2179	http://buttecounty.net/Water%20and%20Resource%20Conservation
Westside (Yolo, Solano, Napa, Lake, Colusa)	Westside Public Information Coordinator	Kim Floyd	info@westsideirwm.com	(530) 661-8115	http://www.westsideirwm.com/



Map 6A – General Land Use

This map presents recent general land use based on the California Department of Conservation Farmland Mapping and Monitoring Program (FMMP) Land Use Data. The following FMMP land use surveys were used to represent the land use conditions in the Upper Sacramento River Region:

- Butte County (2010)

Land use is described by the following categories:

- Urban and Build-Up Lands – Urban and Built-Up land is occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel. Common examples include residential, industrial, commercial, institutional facilities, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, and water control structures.
- Rural and Semi-Agricultural Lands – This includes residential areas of one to five structures per ten acres. This includes semi-agricultural lands such as farmsteads, agricultural storage and packing sheds, unpaved parking areas, composting facilities, equine facilities, firewood lots, and campgrounds.
- Native Vegetation and Grazing Land –
 - » Land on which the existing vegetation is suited to the grazing of livestock. This category is used only in California and was developed in cooperation with the California Cattlemen’s Association, University of California Cooperative Extension, and other groups interested in the extent of grazing activities.
 - » Land which does not meet the criteria of any other category. Typical uses include low density rural development, heavily forested land, mined land, or government land with restrictions on use. This category was subdivided into: Rural Residential Land (R), Vacant or Disturbed Land, Confined Animal Agriculture, and Nonagricultural and Natural Vegetation beginning with the 2004 data. Subsequently, R was subdivided into: Semi-Agricultural and Rural Commercial Land and Rural Residential Land beginning with the 2006 data.
 - » Land which consists of open field areas that do not qualify for an agricultural category, mineral and oil extraction areas, and rural freeway interchanges.
- Prime and Statewide Importance Farmland –
 - » Prime Farmland - Irrigated land with the best combination of physical and chemical features able to sustain long term production of agricultural crops. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for production of irrigated crops at some time during the four years prior to the mapping date.
 - » Farmland of Statewide Importance - Irrigated land similar to Prime

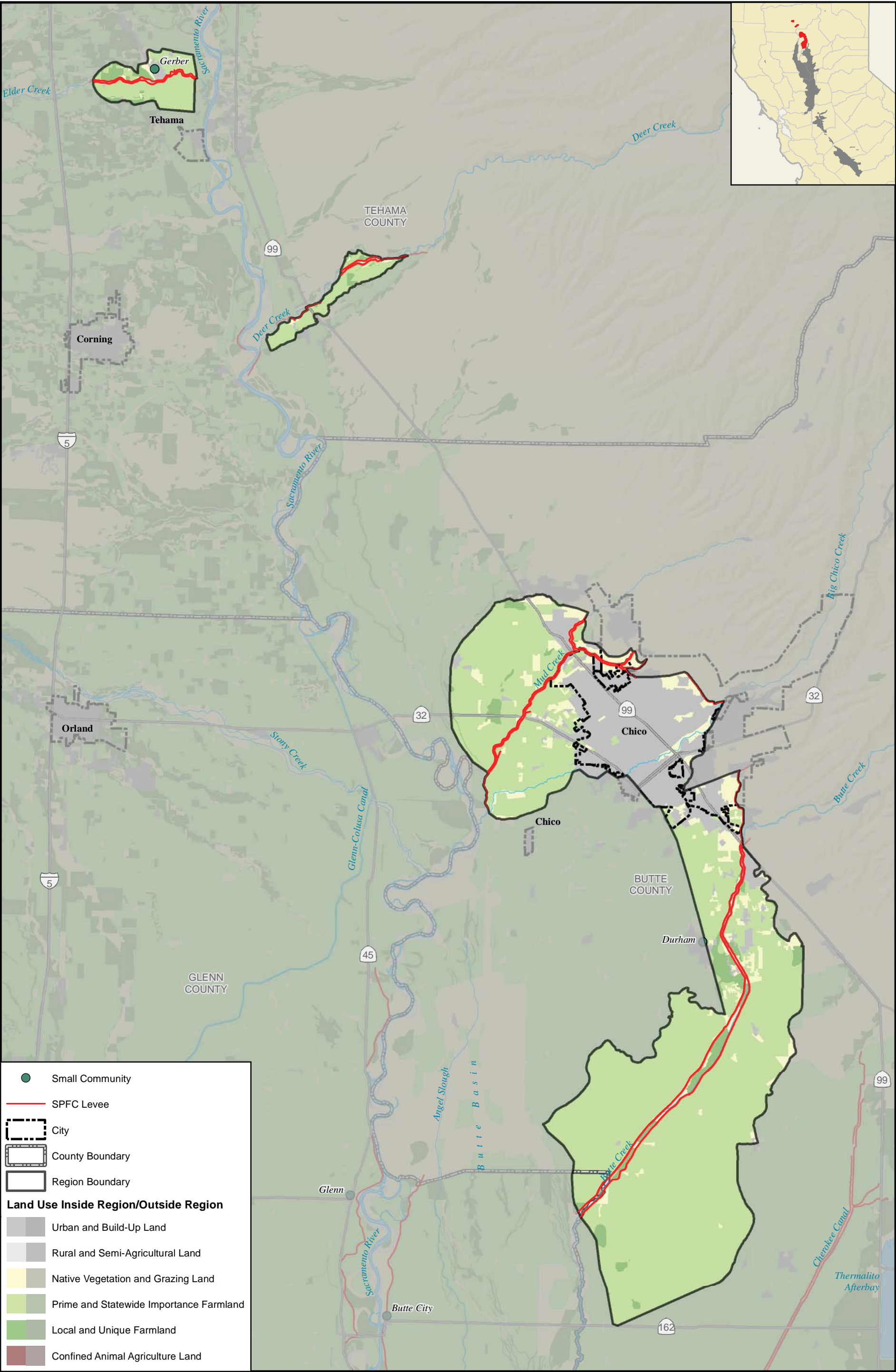
Farmland that has a good combination of physical and chemical characteristics for the production of agricultural crops. This land has minor shortcomings, such as greater slopes or less ability to store soil moisture than Prime Farmland. Land must have been used for production of irrigated crops at some time during the four years prior to the mapping date.

- Local and Unique Farmland –
 - » Farmland of Local Importance - All farmable lands that do not meet the definitions of Prime, Statewide, or Unique. This includes land that is or has been used for irrigated pasture, dryland farming, confined livestock and dairy, poultry facilities, aquaculture and grazing land.
 - » Unique Farmland - Lesser quality soils used for the production of the state’s leading agricultural crops. This land is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the four years prior to the mapping date.
 - » Confined Animal Agriculture Land - This includes aquaculture, dairies, feedlots, and poultry facilities. Confined Animal Agriculture qualifies for Farmland of Local Importance in some counties.

Land use in the Upper Sacramento River Region is primarily Prime and Statewide Importance Farmland with some large areas of Local and Unique Farmland and Native Vegetation and Grazing Land. The only urban areas of >10,000 people or more in the Upper Sacramento River Region is Chico.

Land Type Category	Acres of Land Type	Total % of Region
Urban and Build-Up Land	11,250	15%
Native Vegetation and Grazing Land	6,690	9%
Local and Unique Farmland	3,150	4%
Prime and Statewide Importance Farmland	54,100	72%
Confined Animal Agricultural Land	0	0%
Rural and Semi-Agricultural Land	0	0%
Total	75,190	100%





Small Community

SPFC Levee

City

County Boundary

Region Boundary

Land Use Inside Region/Outside Region

Urban and Build-Up Land

Rural and Semi-Agricultural Land

Native Vegetation and Grazing Land

Prime and Statewide Importance Farmland

Local and Unique Farmland

Confined Animal Agriculture Land

1" = 3 miles

0

0.75

1.5

3

Miles

N

Datum: NAD 83

Projection: CA (Teale) Albers

Zone: N/A

Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

Upper Sacramento River

General Land Use

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DEPARTMENT OF WATER RESOURCES

STATE OF CALIFORNIA

Prepared By: K. Miller

Date: May 10, 2013

File: Z:\Projects\109146\Map06_LandUse.mxd

MAP 6A

DRAFT Upper/Mid-Sacramento River Regional Flood Atlas

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Map 6B – General Land Use

This map presents recent general land use based on the California Department of Conservation Farmland Mapping and Monitoring Program (FMMP) Land Use Data. The following FMMP land use surveys were used to represent the land use conditions in the Mid-Sacramento River Region:

- Colusa (2010), Glenn (2010), Lake (2010), and Yolo (2010) Counties

Land use is described by the following categories:

- Urban and Build-Up Lands – Urban and Built-Up land is occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel. Common examples include residential, industrial, commercial, institutional facilities, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, and water control structures.
- Rural and Semi-Agricultural Lands – This includes residential areas of one to five structures per ten acres. This includes semi-agricultural lands such as farmsteads, agricultural storage and packing sheds, unpaved parking areas, composting facilities, equine facilities, firewood lots, and campgrounds.
- Native Vegetation and Grazing Land –
 - » Land on which the existing vegetation is suited to the grazing of livestock. This category is used only in California and was developed in cooperation with the California Cattlemen's Association, University of California Cooperative Extension, and other groups interested in the extent of grazing activities.
 - » Land which does not meet the criteria of any other category. Typical uses include low density rural development, heavily forested land, mined land, or government land with restrictions on use. This category was subdivided into: Rural Residential Land (R), Vacant or Disturbed Land, Confined Animal Agriculture, and Nonagricultural and Natural Vegetation beginning with the 2004 data. Subsequently, R was subdivided into: Semi-Agricultural and Rural Commercial Land and Rural Residential Land beginning with the 2006 data.
 - » Land which consists of open field areas that do not qualify for an agricultural category, mineral and oil extraction areas, and rural freeway interchanges.
- Prime and Statewide Importance Farmland –
 - » Prime Farmland - Irrigated land with the best combination of physical and chemical features able to sustain long term production of agricultural crops. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for production of irrigated crops at some time during the four years prior to the mapping date.
 - » Farmland of Statewide Importance - Irrigated land similar to Prime Farmland that has a good combination of physical and chemical char-

acteristics for the production of agricultural crops. This land has minor shortcomings, such as greater slopes or less ability to store soil moisture than Prime Farmland. Land must have been used for production of irrigated crops at some time during the four years prior to the mapping date.

- Local and Unique Farmland –
 - » Farmland of Local Importance - All farmable lands that do not meet the definitions of Prime, Statewide, or Unique. This includes land that is or has been used for irrigated pasture, dryland farming, confined livestock and dairy, poultry facilities, aquaculture and grazing land.
 - » Unique Farmland - Lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the four years prior to the mapping date.
 - » Confined Animal Agriculture Land - This includes aquaculture, dairies, feedlots, and poultry facilities. Confined Animal Agriculture qualifies for Farmland of Local Importance in some counties.

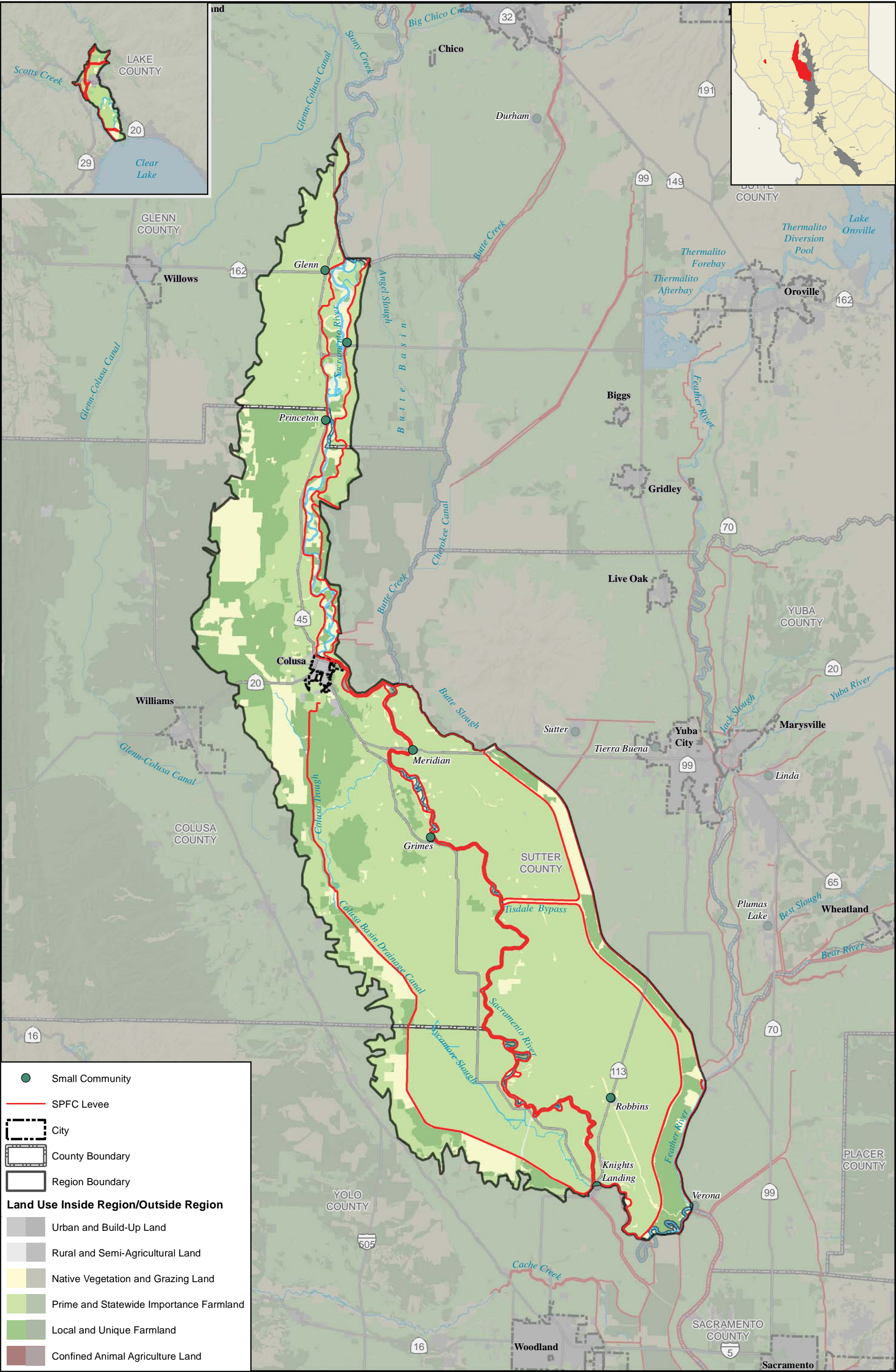
The Mid-Sacramento River region consists of mostly agricultural land designated as “Prime and Statewide Importance Farmland” with areas of “Local and Unique Farmland” and “Native vegetation and grazing land.”

The city of Colusa is the only urban area within the region.

Land Type Category	Acres of Land Type	Total % of Region
Urban and Build-Up Land	3,360	1%
Native Vegetation and Grazing Land	49,530	12%
Local and Unique Farmland	67,450	17%
Prime and Statewide Importance Farmland	274,370	70%
Confined Animal Agricultural Land	0	0%
Rural and Semi-Agricultural Land	0	0%
Total	394,710	100%



Agriculture is the predominant land use in the Mid-Sacramento River Region



1" = 5 miles

0 1.25 2.5 5 Miles

Datum: NAD 83 Projection: CA (Teale) Albers
Zone: N/A Units: meters
Sources: See Appendix for source citations

Regional Flood Management Planning

Mid-Sacramento River

General Land Use

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Prepared By: K. Miller
Date: May 10, 2013
File: Z:\Projects\109146\Map06_LandUse.mxd

MAP 6B

Map 7A – Local Maintaining Agencies

This map illustrates the various maintaining agencies within the Upper Sacramento River Flood Management Planning Region. Maintaining agencies may be any city, county, district or other political subdivision of the State that is authorized to maintain levees. The California Department of Water Resources (DWR) maintains levees pursuant to California Water Code (CWC) Sections 8361 and 12878, and in that capacity is considered a maintaining agency. Inspection reports on the conditions of levees and/or other facilities such as channels, structures, and pump stations are briefly described below.

Local Maintaining Agency Annual Report for Levees of the State Plan of Flood Control – California Water Code Sections 9140-9141

DWR prepares the Local Maintaining Agency (LMA) Annual Report annually for the Central Valley Flood Protection Board (CVFPB) to meet the requirements of California Water Code (CWC) Section 9141.

LMAs submit specific information to DWR by September 30 of each year regarding the levees they operate and maintain. According to CWC Section 9140, the information submitted to DWR shall include all of the following five items:

- 1. Information known to the LMA that is relevant to the condition or performance of the Project Levee
- 2. Information identifying known conditions that might impair or compromise the level of flood protection provided by the Project Levee
- 3. A summary of the maintenance performed by the LMA during the previous fiscal year
- 4. A statement of work and estimated cost for operation and maintenance of the Project Levee for the current fiscal year, as approved by the LMA
- 5. Any other readily available information contained in the records of the LMA relevant to the condition or performance of the Project Levee, as determined by the CVFPB or DWR

DWR summarizes the information in a report format and provides the report to the CVFPB by December 31 of each year. Submission of information by LMA includes levee conditions and operation and maintenance activities which are essential for a comprehensive understanding of the flood protection system in the Central Valley. The information presented in this report is also critical to flood control system evaluation and assessment. The reporting status of each LMA for 2012 is presented on the table below.

2012 Inspection Report of the Central Valley State-Federal Flood Protection System

Federal Flood Control Regulations (Title 33 of the Code of Federal Regulations, Section 208.10 (33 CFR 208.10)) require that federal flood protection facilities be inspected at least four times a year — immediately prior to the beginning of the flood season, immediately following each major high water period, and otherwise at intervals not exceeding 90 days. In addition, inspections at intermediate times may be necessary. These periodic

inspections are specifically needed to ensure that maintenance measures for project facilities are being effectively carried out, not to determine other inherent problems (geotechnical, flow capacity, etc.) with the project facilities.

The 2012 Inspection Report of the Central Valley State-federal Flood Control System is the annual report on the effectiveness of facility maintenance activities of the maintaining agencies. The report is based primarily on DWR’s inspections conducted during the summer and fall of 2012. The overall ratings (see table below) are included for each of the LMAs within the Upper Sacramento River Region based on the one of three possible ratings based on the state of its levees:

- Acceptable (A) – No immediate work required, other than routine maintenance. The flood protection project will function as designed and intended with a high degree of reliability, and necessary cyclic maintenance is being performed adequately.
- Minimally Acceptable (M) – One or more deficient conditions exist in the flood protection project that needs to be improved or corrected. However, the project will essentially function as designed with a lesser degree of reliability than what the project could provide.
- Unacceptable (U) – One or more deficient conditions exist that may prevent the project from functioning as designed, intended, or required.

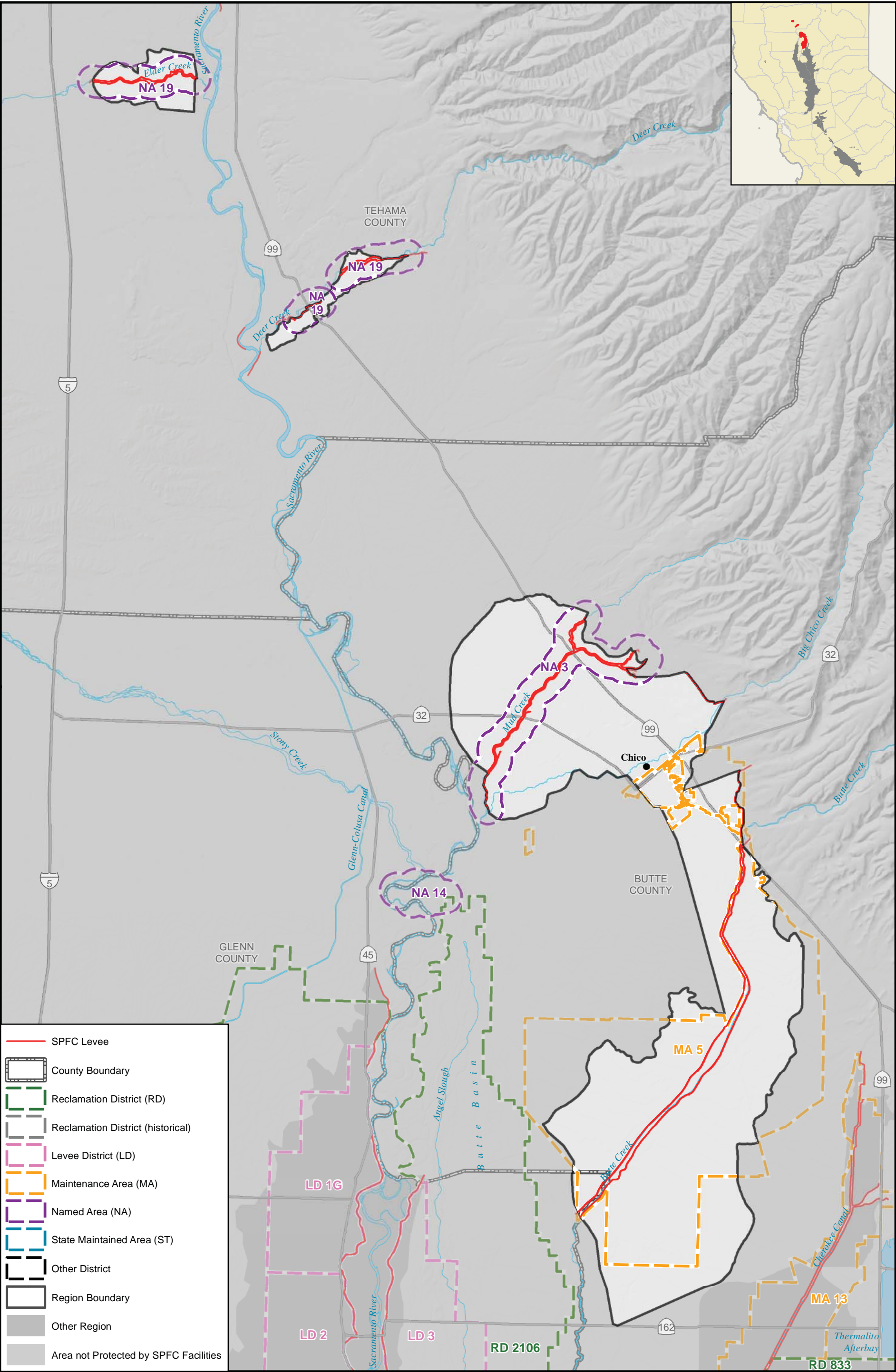
USACE Inspections

USACE conducts inspections to determine whether federal and nonfederal flood protection facilities meet federal maintenance requirements. This determination has a major bearing on eligibility for USACE’s rehabilitation assistance under Public Law 84-99. There are two types of regular inspections conducted by USACE: routine inspections and periodic inspections. Routine inspections are visual inspections conducted annually to verify that the levee system is being properly operated and maintained. Periodic inspections include a more detailed, comprehensive, and consistent evaluation of the condition of the levee system and are conducted every 5 years by a multidisciplinary team.

SPFC Maintaining Agencies	LMA 2012 Annual Reporting				
Agency Name	Part 1	Part 2	Part 3	Part 4	Part 5
Butte County Public Works, NA 3	✓	✓	No	✓	✓
Tehama County Flood Control & Water Conservation District, NA 19	✓	✓	✓	✓	✓
DWR Sutter Maintenance Yard, Maintenance Area 5	✓	No	✓	✓	No

¹The number of channels/structures/pumping plants is presented as (number of structures) followed by rating.

Contact information for the Local Maintaining Agencies can be found in *Directory of Flood Control Officials* published by DWR in September 2011. Detailed information, such as facility modification history, Operations and Maintenance Manuals used and financial data, for local agencies that maintain SPFC facilities can be found in the *Operations & Maintenance Roles and Responsibilities Technical Memorandum* published by DWR in April 2012.



1" = 3 miles

0 0.75 1.5 3 Miles

Datum: NAD 83 Projection: CA (Teale) Albers
Zone: N/A Units: meters
Sources: See Appendix for source citations

Regional Flood Management Planning

Upper Sacramento River

Local Maintaining Agencies

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STATE OF CALIFORNIA

Prepared By: K. Miller
Date: May 10, 2013
File: Z:\Projects\109146\Map07_LMAS.mxd

MAP 7A

Map 7B – Local Maintaining Agencies

This map illustrates the various maintaining agencies within the Mid-Sacramento River Flood Management Planning Region. Maintaining agencies may be any city, county, district or other political subdivision of the State that is authorized to maintain levees. The California Department of Water Resources (DWR) maintains levees pursuant to California Water Code (CWC) Sections 8361 and 12878, and in that capacity is considered a maintaining agency. Inspection reports on the conditions of levees and/or other facilities such as channels, structures, and pump stations are briefly described below.

Local Maintaining Agency Annual Report for Levees of the State Plan of Flood Control – California Water Code Sections 9140-9141

DWR prepares the Local Maintaining Agency (LMA) Annual Report annually for the Central Valley Flood Protection Board (CVFPB) to meet the requirements of California Water Code (CWC) Section 9141.

LMAs submit specific information to DWR by September 30 of each year regarding the levees they operate and maintain. According to CWC Section 9140, the information submitted to DWR shall include all of the following five items:

- 1. Information known to the LMA that is relevant to the condition or performance of the Project Levee
- 2. Information identifying known conditions that might impair or compromise the level of flood protection provided by the Project Levee
- 3. A summary of the maintenance performed by the LMA during the previous fiscal year
- 4. A statement of work and estimated cost for operation and maintenance of the Project Levee for the current fiscal year, as approved by the LMA
- 5. Any other readily available information contained in the records of the LMA relevant to the condition or performance of the Project Levee, as determined by the CVFPB or DWR

DWR summarizes the information in a report format and provides the report to the CVFPB by December 31 of each year. Submission of information by LMA includes levee conditions and operation and maintenance activities which are essential for a comprehensive understanding of the flood protection system in the Central Valley. The information presented in this report is also critical to flood control system evaluation and assessment. The reporting status of each LMA for 2012 is presented on the table below.

2012 Inspection Report of the Central Valley State-Federal Flood Protection System

Federal Flood Control Regulations (Title 33 of the Code of Federal Regulations, Section 208.10 (33 CFR 208.10)) require that federal flood protection facilities be inspected at least four times a year — immediately prior to the beginning of the flood season, immediately following each major high water period, and otherwise at intervals not exceeding 90 days. In addition, inspections at intermediate times may be necessary. These periodic inspections are specifically needed to ensure that maintenance measures for project facilities are being effectively carried out, not to determine other inherent problems (geotechnical, flow capacity, etc.) with the project facilities.

The 2012 Inspection Report of the Central Valley State-federal Flood Control System is the annual report on the effectiveness of facility maintenance activities of the maintaining agencies. The report is based primarily on DWR’s inspections conducted during the summer and fall of 2012. The overall ratings (see table below) are included for each of the LMAs within the Mid-Sacramento River Region based on the one of three possible ratings based on the state of its levees:

- Acceptable (A) – No immediate work required, other than routine maintenance. The flood protection project will function as designed and intended with a high degree of reliability, and necessary cyclic maintenance is being performed adequately.
- Minimally Acceptable (M) – One or more deficient conditions exist in the flood protection project that needs to be improved or corrected. However, the project will essentially function as designed with a lesser degree of reliability than what the project could provide.
- Unacceptable (U) – One or more deficient conditions exist that may prevent the project from functioning as designed, intended, or required.

USACE Inspections

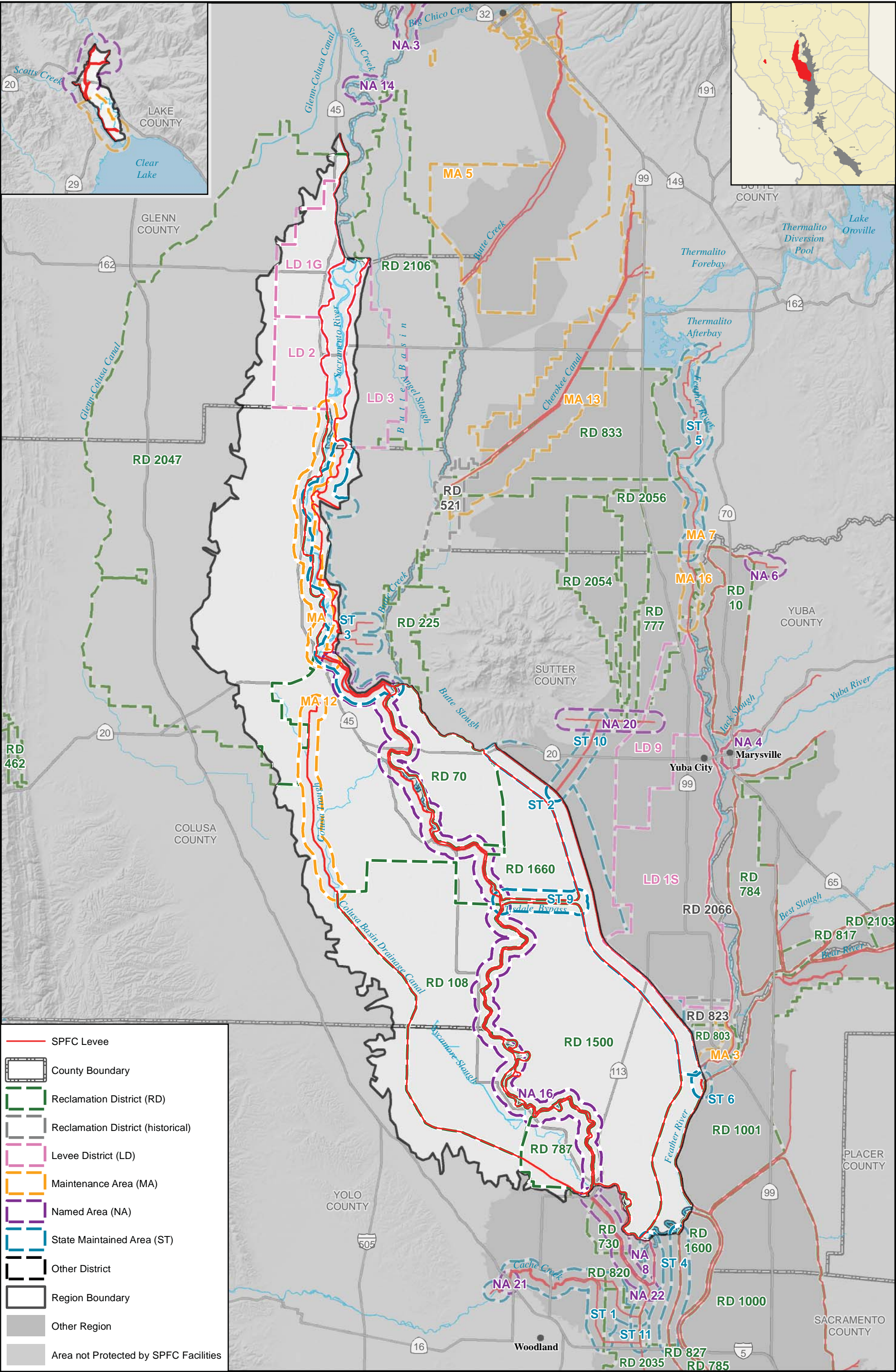
USACE conducts inspections to determine whether federal and nonfederal flood protection facilities meet federal maintenance requirements. This determination has a major bearing on eligibility for USACE’s rehabilitation assistance under Public Law 84-99. There are two types of regular inspections conducted by USACE: routine inspections and periodic inspections. Routine inspections are visual inspections conducted annually to verify that the levee system is being properly operated and maintained. Periodic inspections include a more detailed, comprehensive, and consistent evaluation of the condition of the levee system and are conducted every 5 years by a multidisciplinary team.

SPFC Maintaining Agencies	LMA 2012 Annual Reporting				
Agency Name	Part 1	Part 2	Part 3	Part 4	Part 5
Levee District 1, Glenn	✓	✓	✓	✓	✓
Levee District 2	✓	✓	✓	✓	✓
Levee District 3	No	No	No	No	No
Reclamation Districts No. 70, Meridian Farms	No	✓	✓	✓	No
Reclamation District 108	✓	✓	✓	✓	No
Reclamation District No. 787, Fair Ranch	✓	✓	✓	✓	No
Reclamation District No. 1500, Sutter Basin	✓	✓	✓	No	No
Reclamation District 1660, Tisdale	No	No	✓	✓	No
Lake County Watershed Protection District, NA 9	✓	✓	✓	✓	✓
Sacramento River West Side Levee District, NA 16	✓	✓	✓	✓	No
Yolo County Service Area 6, NA 22	No	No	✓	No	No
DWR Sutter Maintenance Yard, Maintenance Area 1	No	No	✓	✓	✓
DWR Sutter Maintenance Yard, Maintenance Area 12	✓	No	✓	✓	No
DWR Sutter Maintenance Yard, Maintenance Area 17	✓	✓	✓	✓	No
DWR Sutter Maintenance Yard (Statutory)					

*Overall unit threshold percentage is less than 10.00%, however, U rated miles are present, so the overall unit rating is M instead of A.

¹The number of channels/structures/pumping plants is presented as (number of structures) followed by rating.

Contact information for the Local Maintaining Agencies can be found in *Directory of Flood Control Officials* published by DWR in September 2011. Detailed information, such as facility modification history, Operations and Maintenance Manuals used and financial data, for local agencies that maintain SPFC facilities can be found in the *Operations & Maintenance Roles and Responsibilities Technical Memorandum* published by DWR in April 2012.



1" = 5 miles

0

1.25

2.5

5

Miles

N

Datum: NAD 83

Projection: CA (Teale) Albers

Zone: N/A

Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

Mid-Sacramento River

Local Maintaining Agencies

DRAFT

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CALIFORNIA

DEPARTMENT OF WATER RESOURCES

Prepared By: K. Miller

Date: May 10, 2013

File: Z:\Projects\109146\Map07_LMAS.mxd

MAP 7B

Map 8A – Existing Critical Facilities and Economic Assets

Protected assets and their locations often determine the capability of a Region and its special districts ability to respond to emergencies. The location of these protected assets can also impact the potential losses when a disaster occurs. An inventory of the protected assets is shown on this map.

Upper Sacramento River Flood Planning Region

Over the last century, the Central Valley has experienced intensive development to meet the needs of a growing population. A complex flood risk management system supports and protects a vibrant agricultural economy, several cities and numerous smaller communities and associated infrastructure. The current SPFC flood control system throughout the Central Valley protects a population of over one-million people and billions of dollars worth of assets that are currently located within flood plains, including major freeways, railroads, airports, water supply systems, utilities, and other public and private infrastructure of significant regional and statewide importance.

The Upper Sacramento River Flood Planning Region is rich in these existing assets that are potentially at risk should a flood emergency occur. The Upper Sacramento River Flood Management Planning Region consists predominantly agricultural and rural land, but also contains portions of the City of Chico and several smaller communities such as Tehama.

The Existing Critical Facilities and Economic Assets map indicates existing critical facilities and regional assets identified within the Planning Region, located from various available maps and GIS sources. It is not a complete inventory of all valuable regional assets and facilities, nor is it intended to be. The following list of potential Regional at-risk assets identifies common types of typical assets that may exist, and should be considered, within the Flood Planning Region.

Potential Regional At-Risk Assets

State and Federal Facilities

- State and Federal Highways / Bridges
- Courthouses
- Post Offices
- Prisons
- Military Facilities
- Water Infrastructure
- Canals
- SPFC Levees

Local / County Facilities

- Jails and Detention Centers
- Government Buildings
- Roadways / Bridges
- Transit Centers
- Water / Wastewater facilities
- Airports
- Reservoirs / Aqueducts
- Parks / Zoos
- Local Non-Project Levees

Health and Public Safety

- Hospitals
- Convalescent Facilities
- Medical Facilities / Clinics
- Police
- Fire
- Highway Patrol

Education

- Public Schools
- Libraries
- Colleges / Universities

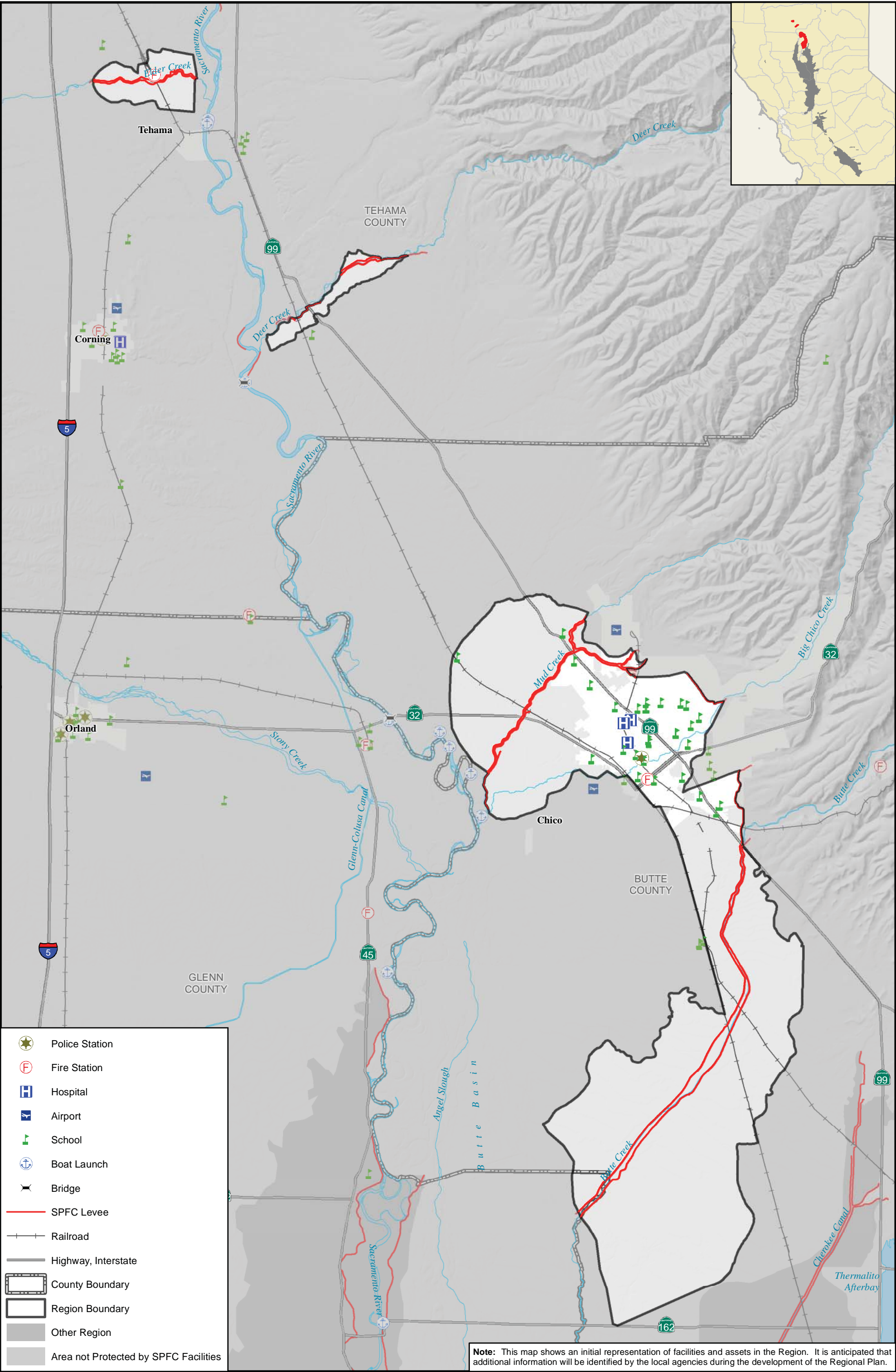
Other Critical Public Assets / Infrastructure

- Bus Terminals
- Railroad Stations
- Railroad Tracks / Yards
- Power Facilities / Substations
- High Voltage Transmission Facilities
- Pipelines
- Stadiums / Arenas / Entertainment Venues
- Regional Shopping Malls
- Hazmat Storage Areas
- Docks / Harbors / Launching Facilities

Note: This map shows an initial representation of facilities and assets in the Region. It is anticipated that additional information will be identified by the local agencies during the development of the Regional Plan.



One of many bridges crossing Butte Creek (1997)



1" = 3 miles

0 0.75 1.5 3 Miles

Datum: NAD 83 Projection: CA (Teale) Albers
Zone: N/A Units: meters
Sources: See Appendix for source citations

Regional Flood Management Planning

Upper Sacramento River

Existing Critical Facilities and Economic Assets

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STATE OF CALIFORNIA

Prepared By: K. Miller
Date: May 10, 2013
File: Z:\Projects\109146\Map08_ExistingAssets.mxd

MAP 8A

Map 8B – Existing Critical Facilities and Economic Assets

Protected assets and their locations often determine the capability of a Region and its special districts ability to respond to emergencies. The location of these protected assets can also impact the potential losses when a disaster occurs. An inventory of the protected assets is shown on this map.

Mid-Sacramento River Flood Planning Region

Over the last century, the Central Valley has experienced intensive development to meet the needs of a growing population. A complex flood risk management system supports and protects a vibrant agricultural economy, several cities and numerous smaller communities and associated infrastructure. The current SPFC flood control system throughout the Central Valley protects a population of over one-million people and billions of dollars worth of assets that are currently located within flood plains, including major freeways, railroads, airports, water supply systems, utilities, and other public and private infrastructure of significant regional and statewide importance.

The Mid-Sacramento River Flood Planning Region is rich in these existing assets that are potentially at risk should a flood emergency occur. The Mid-Sacramento River Flood Management Planning Region consists of predominantly agricultural and rural land, but also contains several cities and smaller communities such as Colusa, Grimes, Knights Landing. The Town of Upper Clear Lake is also included in the Mid-Sacramento River Planning Region.

The Existing Critical Facilities and Economic Assets map indicates existing critical facilities and regional assets identified within the Planning Region, located from various available maps and GIS sources. It is not a complete inventory of all valuable regional assets and facilities, nor is it intended to be. The following list of potential Regional at-risk assets identifies common types of typical assets that may exist, and should be considered, within the Flood Planning Region.



Agriculture dominates much of the Mid-Sacramento River Planning Region

Potential Regional At-Risk Assets

State and Federal Facilities

- State and Federal Highways / Bridges
- Courthouses
- Post Offices
- Prisons
- Military Facilities
- Water Infrastructure
- Canals
- SPFC Levees

Local / County Facilities

- Jails and Detention Centers
- Government Buildings
- Roadways / Bridges
- Transit Centers
- Water / Wastewater facilities
- Airports
- Reservoirs / Aqueducts
- Parks / Zoos
- Local Non-Project Levees

Health and Public Safety

- Hospitals
- Convalescent Facilities
- Medical Facilities / Clinics
- Police
- Fire
- Highway Patrol

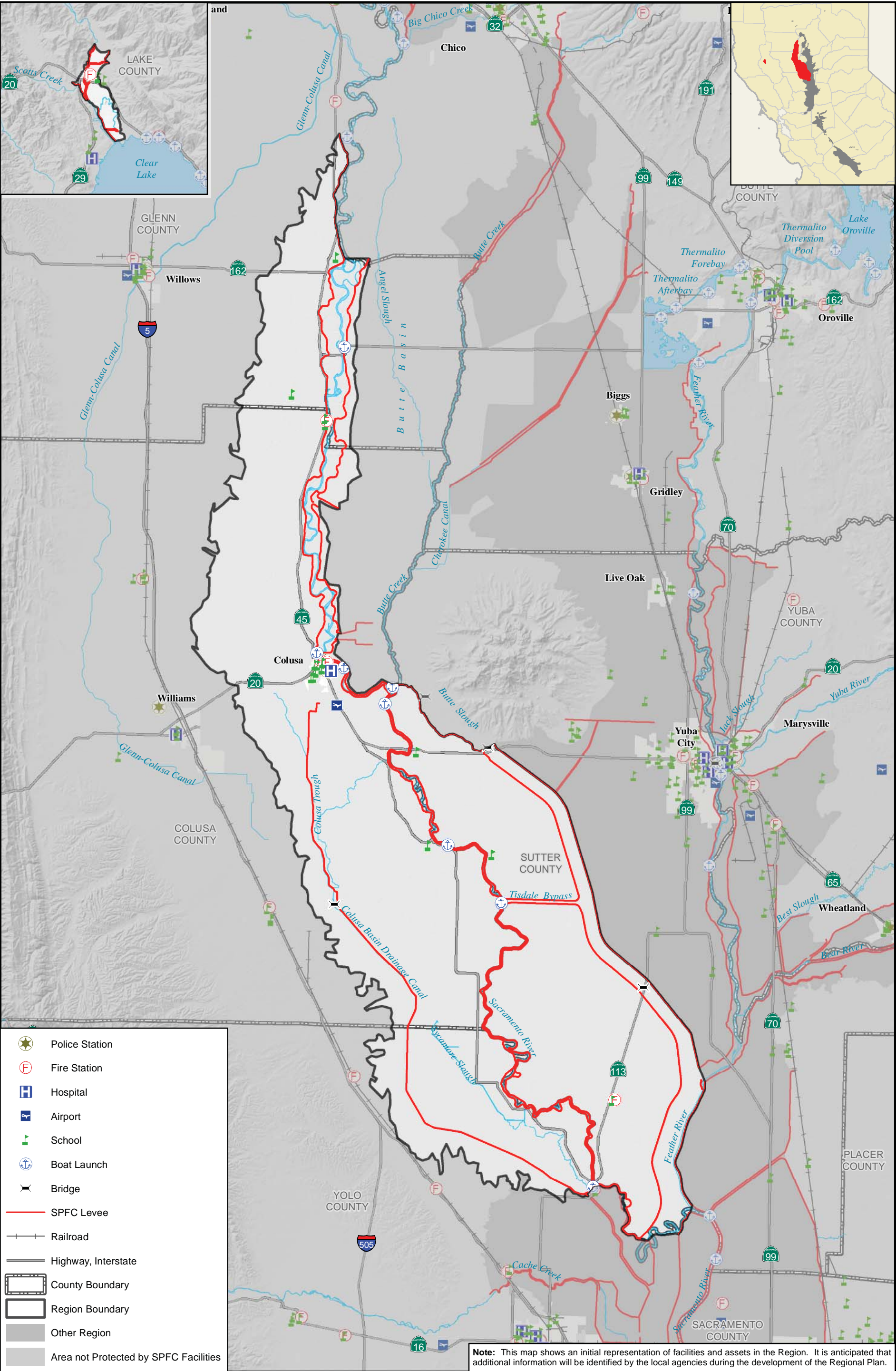
Education

- Public Schools
- Libraries
- Colleges / Universities

Other Critical Public Assets / Infrastructure

- Bus Terminals
- Railroad Stations
- Railroad Tracks / Yards
- Power Facilities / Substations
- High Voltage Transmission Facilities
- Pipelines
- Stadiums / Arenas / Entertainment Venues
- Regional Shopping Malls
- Hazmat Storage Areas
- Docks / Harbors / Launching Facilities

Note: This map shows an initial representation of facilities and assets in the Region. It is anticipated that additional information will be identified by the local agencies during the development of the Regional Plan.



1" = 5 miles

0

1.25

2.5

5

Miles

N

Datum: NAD 83

Projection: CA (Teale) Albers

Zone: N/A

Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

Mid-Sacramento River

Existing Critical Facilities and Economic Assets

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DEPARTMENT OF WATER RESOURCES

Prepared By: K. Miller

Date: May 10, 2013

File: Z:\Projects\109146\Map08_ExistingAssets.mxd

MAP 8B

Map 9A – SPFC and Local Flood Control Facilities

The Upper Sacramento River Flood Management Planning Region contains a number of flood control facilities both locally owned and operated as well as State owned and operated through the State Plan of Flood Control (SPFC). The main purpose of these facilities is to control storm water runoff and protect the local population in the region from flood risks. The SPFC facilities can also serve the purposes of creating hydroelectric power and managing and conveying the State’s potable water supply. SPFC facilities in the region are listed and briefly explained below. Information on local flood control facilities may be provided by local entities during the regional flood management planning process.

Lindo Channel Gates – Located south and upstream of Sycamore Creek, these gates, in cooperation with the Big Chico Creek Gates, control the flow of water into Sycamore Creek. Gates can be opened and closed to allow a small or large amount of water to pass through.

Big Chico Creek Gates – Located south and upstream of Sycamore Creek, these gates are part of a diversion structure which controls the diverted flow of excess water through a diversion channel into Sycamore Creek. Gates can be opened and closed to allow a small or large amount of water to pass through. The gates work in conjunction with the Lindo Channel Gates and the Sycamore Weir.

Little Chico Creek Diversion Structure – Located north of Butte Creek, this ungated structure acts to redirect excess storm water runoff and snow-melt into Butte Creek, while limiting flows through Chico.

M&T Flood Relief Structure – Located outside of the regional boundaries along the Sacramento River, north of the Mid-Sacramento region and

south of the Upper Sacramento River Region, this flood control structure is placed to mitigate flooding associated the storm water runoff. In the Butte Basin, waters from the Sacramento River can spill over and flood the overflow area. Both the Goose Lake and M&T Structures work to allow water to spill into the Butte Basin Overflow Area.

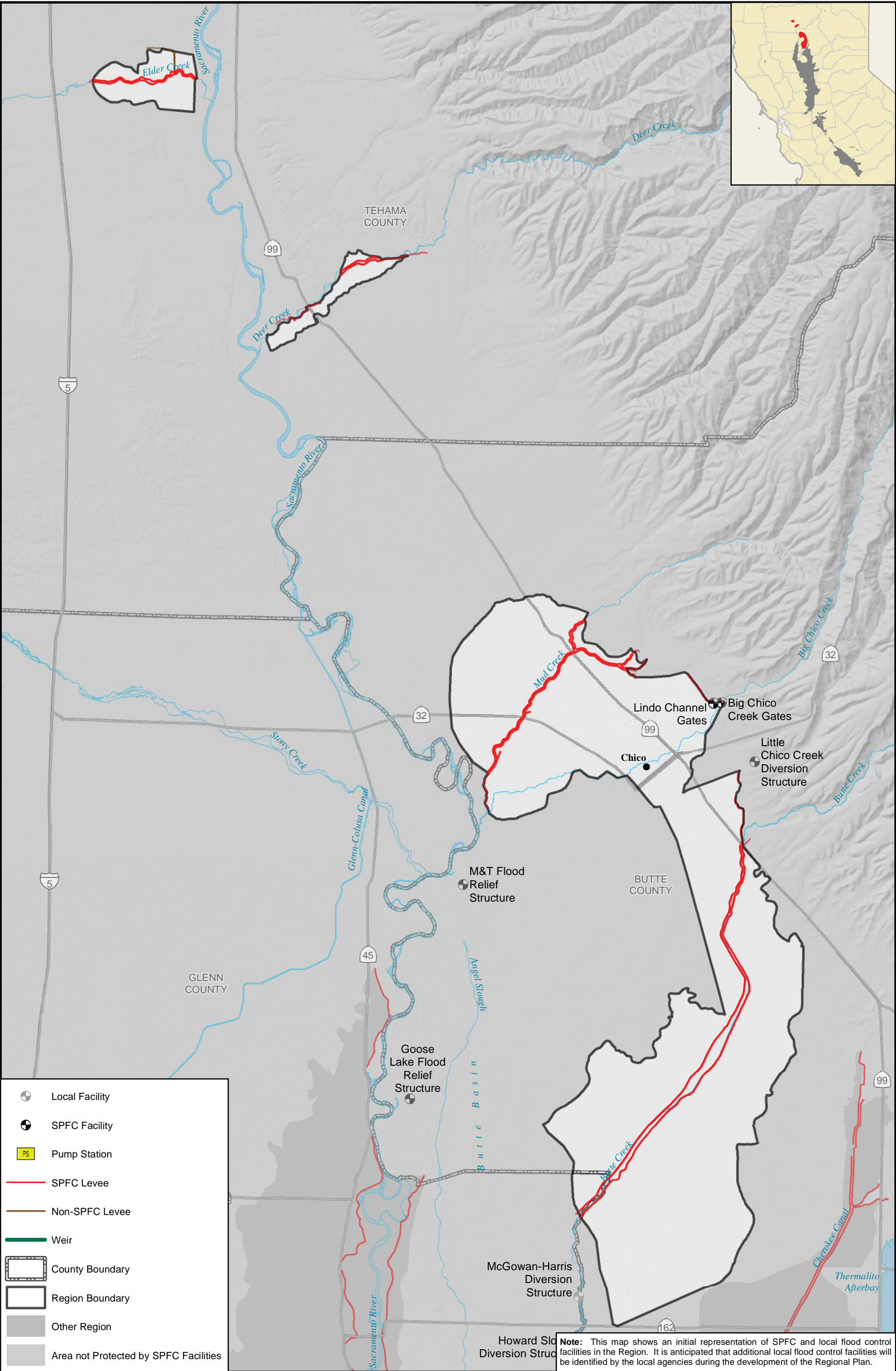
Goose Lake Flood Relief Structure – Located outside of the regional boundaries along the Sacramento River, north of the Mid-Sacramento region and south of the Upper Sacramento River region, this flood control structure is placed to mitigate flooding associated the storm water runoff. In the Butte Basin, waters from the Sacramento River can spill over and flood the overflow area. Both the Goose Lake and M&T Structures work to allow water to spill into the Butte Basin Overflow Area.

McGowan-Harris Diversion Structure – Located along Butte Creek, this diversion structure acts to redirect water from Butte Creek for use in agricultural irrigation. This structure is not part of the SPFC but works in conjunction with SPFC facility Howard Slough Diversion Structure.

Howard Slough Diversion Structure – Located between Butte Creek and Howard Slough, this diversion structure acts to redirect water from Butte Creek. Diversion structures are typically used to divert water from an existing natural watercourse into a water supply conveyance system. These structures can include a weir, sluiceway, intake, or fishway. This diversion structure works in conjunction with the McGowan-Harris Diversion Structure. The two structures are used for irrigation of agricultural land and have no flood management role. There are plans to replace this old structure with a new structure.



Oroville Dam Spillway



1" = 3 miles

00.751.53

Miles

Datum: NAD 83
Zone: N/A
Sources: See Appendix for source citations

Projection: CA (Teale) Albers
Units: meters

Regional Flood Management Planning

Upper Sacramento River
SPFC and Local Flood Control Facilities

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DEPARTMENT OF WATER RESOURCES
STATE OF CALIFORNIA

Prepared By: K. Miller
Date: May 10, 2013

MAP 9A

File: Z:\Projects\109146\Map09_SPFCLocalFloodCtrl.mxd

Map 9B – SPFC and Local Flood Control Facilities

The Mid-Sacramento River Flood Management Planning Region contains a number of flood control facilities both locally owned and operated as well as State owned and operated through the State Plan of Flood Control (SPFC). The main purpose of these facilities is to control storm water runoff and protect the local population in the region from flood risks. The SPFC facilities also serve the purposes of creating hydroelectric power and managing and conveying the State’s potable water supply. SPFC facilities in the Region are listed and briefly explained below. Information on local flood control facilities may be provided by local entities during the regional flood management planning process.

Clear Lake Pumping Plant – Located north of Clear Lake, downstream from Tule Lake, sometimes called the Middle Creek Project, this pumping plant pumps water along Rodman Slough upstream of where it enters Clear Lake. This plant is used to supply agriculture irrigation to surrounding farms and to drain low lying areas behind levees.

Lake County Levees – Located near Scotts Creek just north of Clear Lake, these levees assist in confining storm water runoff and conveying the runoff south to Clear Lake.

Butte Slough Outfall Gate – Located near the intersection of Butte Creek and the Sacramento River, the outfall gate controls the flow of storm water from Butte Slough into the Sacramento River. Gates act as a flood control device as they can be opened and closed to allow a small or large amount of water to pass through. Flow rates exiting the gates are watched and monitored for effects on both whitewater sporting activities and fish habitat. In dry months, the gates are also used to allow water into the Sacramento River for agricultural irrigation.

Tisdale Weir – Located between the Yolo Bypass and the Sacramento River, this structure controls the hydraulic energy of flowing water from the river into the bypass. Acting as a barrier for water within the bypass, the weir is designed to alter the flow characteristics of the water. Water pools behind the weir and is released slowly once the water level has risen to the top of the barrier. Altering the hydraulic energy of the flowing water can prevent damage to the flood control system downstream. The weir is a low point where water can escape the river. This reduces the pressure on river levees downstream.

Knights Landing Outfall Structure – Located at the intersection of the Sacramento River and Sycamore Slough, this outfall structure consists of gates which control the amount of water which enters the main drainage channel of Colusa Basin from the Sacramento River. They are sometimes called Sycamore Slough Outfall Gates. The outfall structure consists of a concrete slab foundation having a long center section with abutments and wing walls on each side. The abutments close and open to let a smaller or larger amount of water through. The gates protect the lower Colusa Drainage Basin from backwater of the Sacramento River. The gates also assist with agricultural irrigation during the dry season.

Fremont Weir – Located just south of Knights Landing Outfall Structure at the junction of the Sacramento River and the joint Feather River/Sutter Bypass channel, the Fremont Weir controls the hydraulic energy of flowing water from the Sacramento River, Sutter Bypass, and Feather River as it enters into the Yolo Bypass. Acting as a barrier for water within the bypass, the weir is designed to alter the flow characteristics of the water as it passes over the weir. Water pools behind the weir and is released slowly once the water level has risen to the top of the barrier. Altering the hydraulic energy of the flowing water can prevent damage to the flood control system downstream.

M&T Flood Relief Structure – Located outside of the regional boundaries along the Sacramento River, north of the Mid-Sacramento River region and south of the Upper Sacramento region, this flood control structure is placed to mitigate flooding associated the storm water runoff. In the Butte Basin, waters from the Sacramento River can spill over and flood the overflow area. Both the Goose Lake and M&T Structures work to allow water to spill into the Butte Basin Overflow Area.

Goose Lake Flood Relief Structure – Located outside of the regional boundaries along the Sacramento River, north of the Mid-Sacramento River region and south of the Upper Sacramento region, this flood control structure is placed to mitigate flooding associated the storm water runoff. In the Butte Basin, waters from the Sacramento River can spill over and flood the overflow area. Both the Goose Lake and M&T Structures work to allow water to spill into the Butte Basin Overflow Area.

Howard Slough Diversion Structure – Located between Butte Creek and Howard Slough, this diversion structure acts to redirect water from Butte Creek. Diversion structures are typically used to divert water from an existing natural watercourse into a water supply conveyance system. These structures can include a weir, sluiceway, intake, or fishway. This diversion structure works in conjunction with the McGowan-Harris Diversion Structure. The two structures are used for irrigation of agricultural land and have no flood management role. There are plans to replace this old structure with a new structure.

McGowan-Harris Diversion Structure – Located along Butte Creek, this diversion structure acts to redirect water from Butte Creek for use in agricultural irrigation. This structure is not part of the SPFC but works in conjunction with SPFC facility Howard Slough Diversion Structure.

Sutter Butte Canal Headgate – Located at the exit point of the Thermalito Reservoir, the head gate acts as a floodgate to control the release and flow of water from the reservoir into the Feather River. Water travels to the head gate from upstream where it is released from Lake Oroville. The picture below depicts how a head gate works, as the individual sections can be opened and closed in order to allow a small or large amount of water to pass through.

Sutter Bypass Pump Stations – Three Pump Stations are located along the Sutter Bypass. Specifically, one is located west of the Tisdale Weir, one on the northerly end of the bypass, and one on the southerly ends of the bypass. A pump station is used to supply water to the canal and drain low lying land. Water can be led into and out of the bypass by pumping. Water is pumped into the bypass during flood season and pumped out of the bypass for irrigation during the dry season.

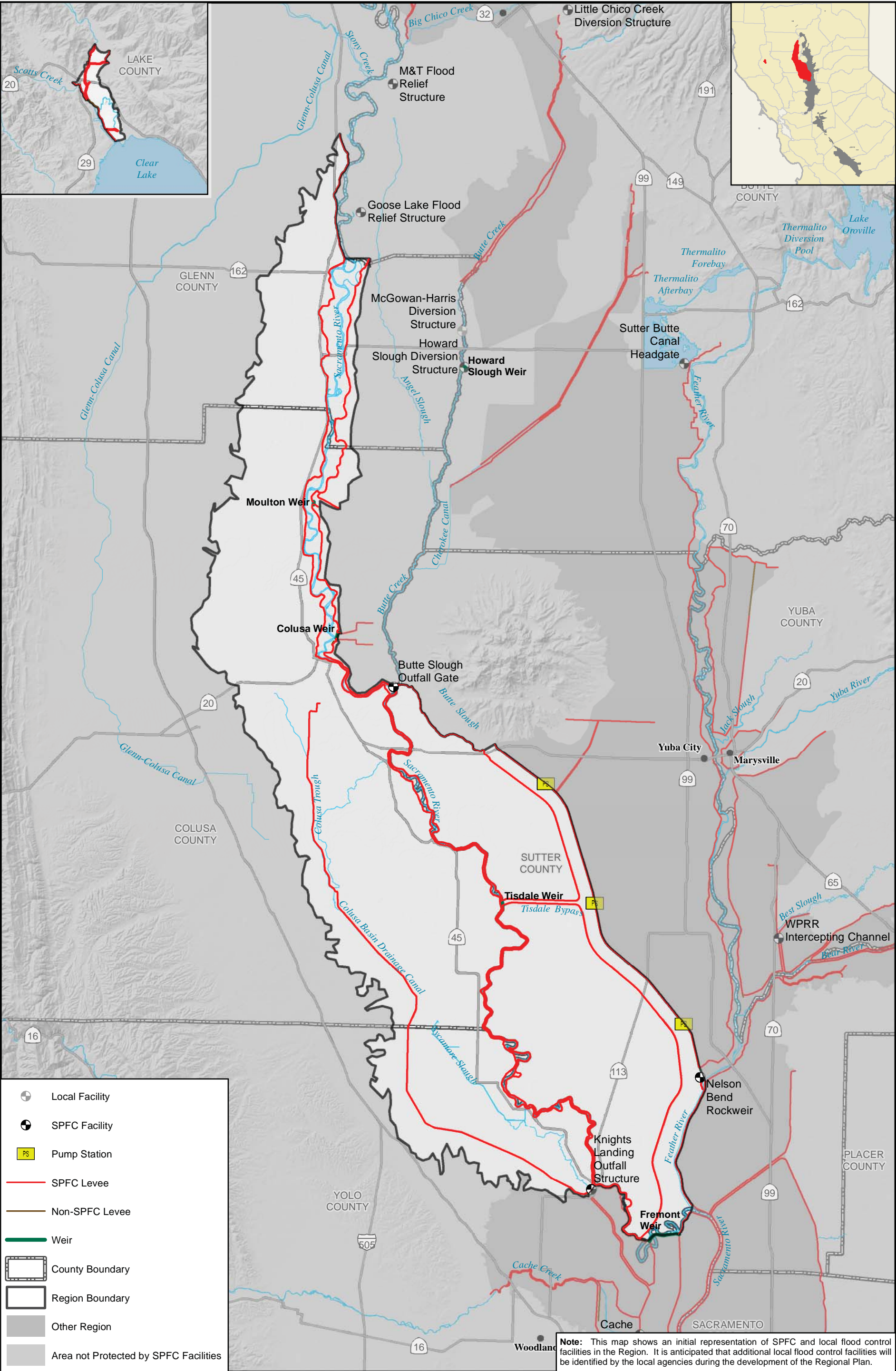
Sutter Bypass – Located along the western edge of Sutter County, the bypass conveys water from just south of the Sutter Buttes to the Fremont Weir. This bypass is a leveed channel of the regional flood control system and conveys water from the Tisdale Weir to the Yolo Bypass and Sacramento River.

WPRR Interceptor Channel – Located along the Bear River, this man-made channel catches storm water runoff and guides the water from open farmland south to the Bear River. This channel prevents flooding through the collection of storm water and its conveyance to a body which can contain the flows.

Nelson Bend Rockweir – Located at the intersection of the Sutter Bypass and Feather River, this rockweir controls the hydraulic energy of flowing water from the river into the bypass. Acting as a barrier across the river, the weir is designed to alter the flow characteristics of the water. Water pools behind the weir and is released slowly once the water level has risen to the top of the barrier. Altering the hydraulic energy of the flowing water can prevent damage to the flood control system downstream.

Yolo Bypass – Located between Yolo and Sacramento Counties, south of the Fremont Weir, this bypass protects Sacramento and other riverside communities from flooding through a series of weirs. The weirs connect the bypass to the Sacramento bypass as well as various local creeks. The bypass is an area of land where excess flood waters in the surrounding rivers and creeks can be diverted to prevent flooding in riverside communities. The Yolo Bypass conveys water to the Delta.

Cache Creek Settling Basin – Located along the Yolo Bypass near Cache Creek, this settling basin is an area where water from Cache Creek collects before entering the Yolo Bypass flood control feature. Allowing water to settle controls flow rates and reduces sediment transport into the Yolo Bypass. This helps to maintain the flood conveyance integrity of the Yolo Bypass.

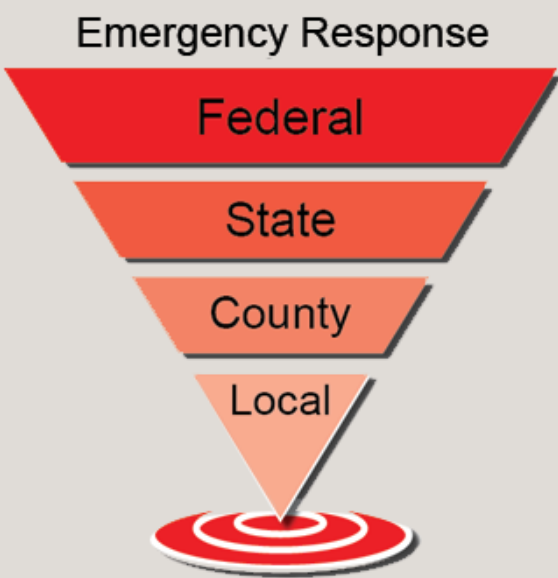


Map 10A – Flood Emergency Response Facilities

Critical Emergency Response facilities and their locations often determine the capability of a region and its special districts ability to respond to emergencies. The location of these critical facilities can also impact the potential losses when a disaster occurs. An inventory of the critical emergency response facilities is shown on this map.

As set forth in the California Government Code, the California Public Contract, the California Water Code, and the State Emergency Plan, the Department of Water Resources is the lead State agency for responding to flood emergencies; however every emergency begins at the local level and timely coordination of response efforts is critical to saving lives, property, and the environment. Emergency response planning provides a guide to Local Maintaining Agencies (LMA), Operational Areas (OA), and Department of Water Resources (DWR) for addressing flood threats as quickly as possible using the Standardized Emergency Management System (SEMS) and the Incident Command System (ICS). It is vital that local and county agencies follow SEMS and ICS protocols for addressing threats at the local level and have complete up-to-date emergency action plans that:

- Streamline communications (contact information, call tree, radio frequencies, protocols)
- Provide preparation and activation protocols
- Identify Emergency Operation Center locations
- Provide a management structure for emergency work
- Provide protocols for prioritizing actions
- Direct resources effectively during an emergency



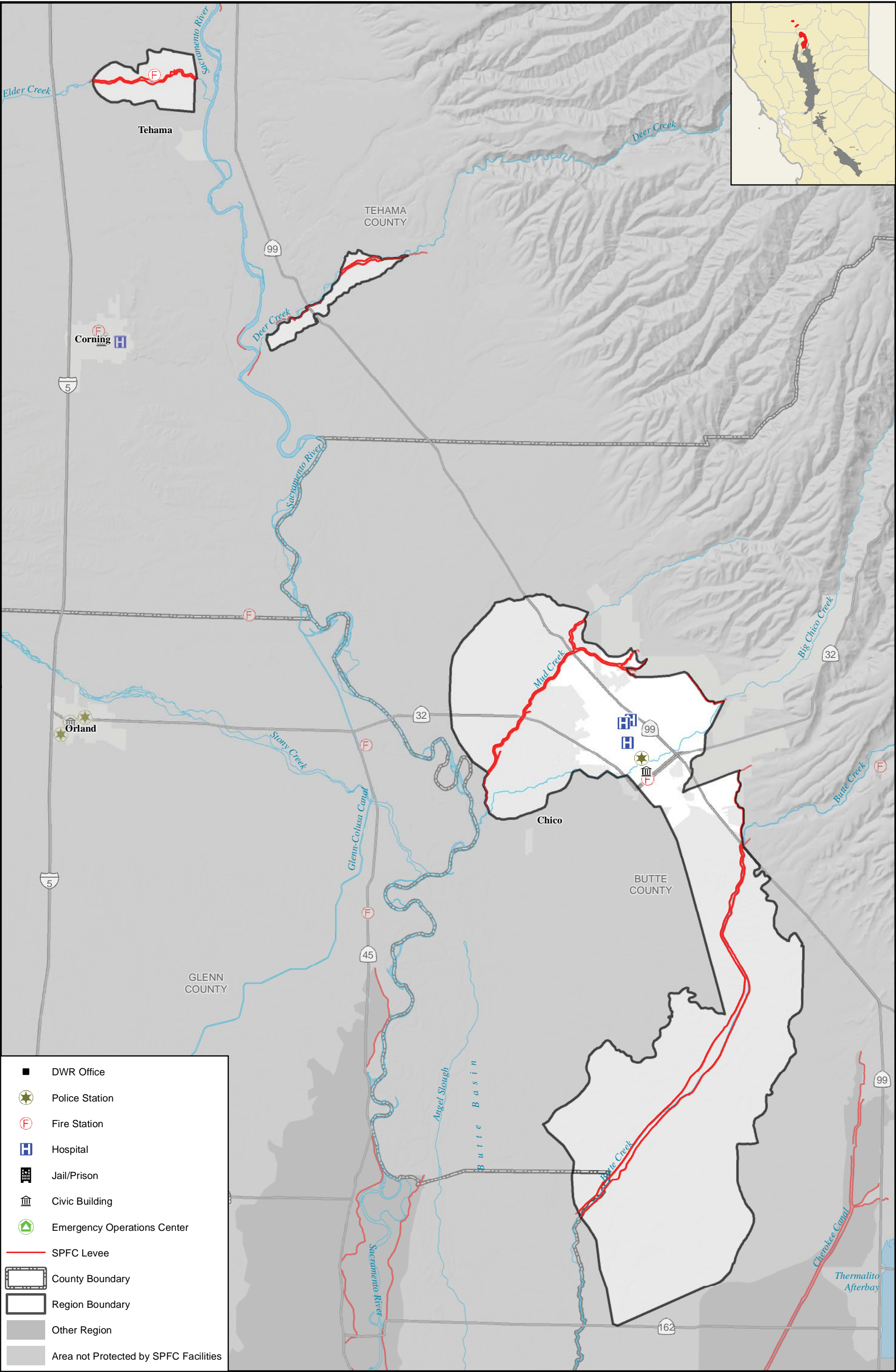
- Provide locations and procedures to obtain necessary resources (i.e., equipment, materials, manpower)
- Identify critical sites or problem areas that need special attention
- Identify critical infrastructure
- Provide an evacuation plan and rally points
- Include training and exercise schedule

LMA Emergency Action Plans support County level emergency response plans and need to be included in the flood hazard component of a Multi-Hazard Mitigation (MHM) Plan. The contact information for Flood Emergency Managers in the Upper Sacramento River region is provided below:

OA (County Agency)	Emergency Contact #	Address	MHM Plan contains flood hazard component
Butte County Emergency Services	530-538-7373	25 County Center Drive, Suite 200, Oroville, CA 95965	Yes
Glenn County Emergency Services	530-934-6431	543 West Oak Street, Willows, CA 95988	No
Tehama County Emergency Services	530-529-7900	502 Oak Street, Red Bluff, CA 96080	Yes
State Agency	Emergency Contact #	Address	
DWR Flood Operations Center	916-574-2619	3310 El Camino Ave, Suite 200, Sacramento, CA 95821	
Cal EMA Inland Region	916-845-8911	3650 Schriever Ave, Mather, CA 95655	

DWR does not declare emergencies, order or coordinate evacuations, or coordinate shelters. DWR supports local flood emergency response by providing real-time weather and hydrology conditions and warnings, technical assistance, information dissemination, and flood fight resources through specific requests from California Emergency Management Agency (CalEMA) Operational Areas.





1" = 3 miles

0 0.75 1.5 3 Miles

Datum: NAD 83 Projection: CA (Teale) Albers
Zone: N/A Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

Upper Sacramento River

Flood Emergency Response Facilities

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DEPARTMENT OF WATER RESOURCES
STATE OF CALIFORNIA

Prepared By: K. Miller

Date: May 10, 2013

File: Z:\Projects\109146\Map10_FloodER.mxd

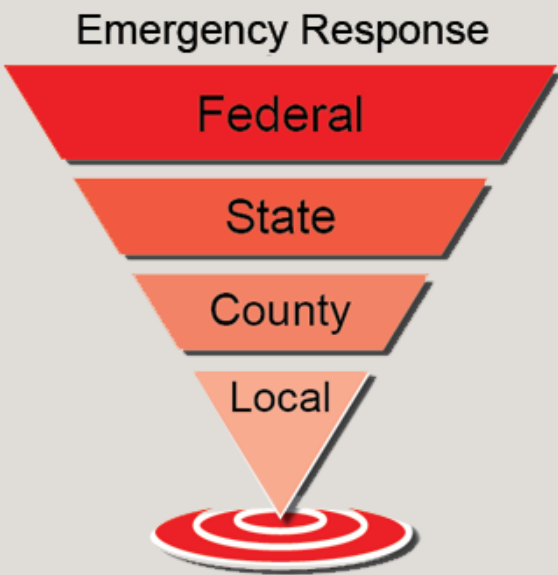
MAP 10A

Map 10B – Flood Emergency Response Facilities

Critical Emergency Response facilities and their locations often determine the capability of a region and its special districts ability to respond to emergencies. The location of these critical facilities can also impact the potential losses when a disaster occurs. An inventory of the critical emergency response facilities is shown on this map.

As set forth in the California Government Code, the California Public Contract, the California Water Code, and the State Emergency Plan, the Department of Water Resources is the lead State agency for responding to flood emergencies; however every emergency begins at the local level and timely coordination of response efforts is critical to saving lives, property, and the environment. Emergency response planning provides a guide to Local Maintaining Agencies (LMA), Operational Areas (OA), and Department of Water Resources (DWR) for addressing flood threats as quickly as possible using the Standardized Emergency Management System (SEMS) and the Incident Command System (ICS). It is vital that local and county agencies follow SEMS and ICS protocols for addressing threats at the local level and have complete up-to-date emergency action plans that:

- Streamline communications (contact information, call tree, radio frequencies, protocols)
- Provide preparation and activation protocols
- Identify Emergency Operation Center locations
- Provide a management structure for emergency work
- Provide protocols for prioritizing actions
- Direct resources effectively during an emergency



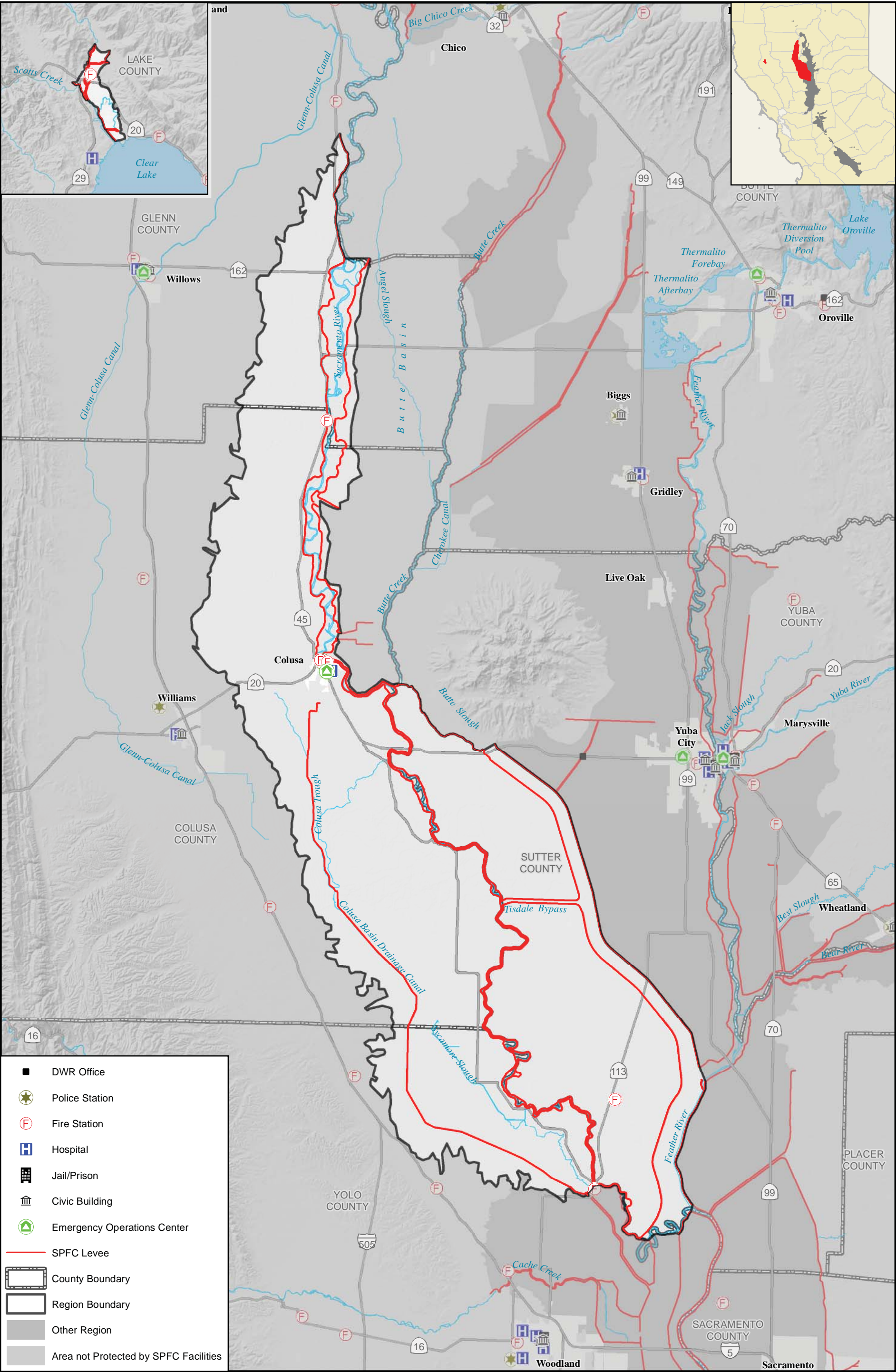
- Provide locations and procedures to obtain necessary resources (i.e., equipment, materials, manpower)
- Identify critical sites or problem areas that need special attention
- Identify critical infrastructure
- Provide an evacuation plan and rally points
- Include training and exercise schedule

LMA Emergency Action Plans support County level emergency response plans and need to be included in the flood hazard component of a Multi-Hazard Mitigation (MHM) Plan. The contact information for Flood Emergency Managers in the Mid-Sacramento River region is provided below:

OA (County Agency)	Emergency Contact #	Address	MHM Plan contains flood hazard component
Sutter County Emergency Management	530-822-7400	1130 Civic Center Blvd, Yuba City, CA 95933	Yes
Glen County Sheriff	530-934-6431	543 West Oak Street, Willows, CA 95988	No
Sutter County Emergency Services	530-458-0200	929 Bridge Street, Colusa, CA 95932	Yes
Butte County Emergency Services	530-538-7573	25 County Center Drive, Suite 200, Oroville, CA 95965	No
State Agency	Emergency Contact #	Address	
DWR Flood Operations Center	916-574-2619	3310 El Camino Ave, Suite 200, Sacramento, CA 95821	
Cal EMA Inland Region	916-845-8911	3650 Schriever Ave, Mather, CA 95655	

DWR does not declare emergencies, order or coordinate evacuations, or coordinate shelters. DWR supports local flood emergency response by providing real-time weather and hydrology conditions and warnings, technical assistance, information dissemination, and flood fight resources through specific requests from California Emergency Management Agency (CalEMA) Operational Areas.





1" = 5 miles

0 1.25 2.5 5 Miles

Datum: NAD 83 Projection: CA (Teale) Albers
Zone: N/A Units: meters
Sources: See Appendix for source citations

Regional Flood Management Planning

Mid-Sacramento River

Flood Emergency Response Facilities

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CALIFORNIA

DEPARTMENT OF WATER RESOURCES
STATE OF CALIFORNIA

Prepared By: K. Miller
Date: May 10, 2013
File: Z:\Projects\109146\Map10_FloodER.mxd

MAP 10B

Map 11A – Overall Levee Conditions

The overall physical condition of SPFC levees is shown on this map. It includes a simplified representation of levee conditions, based on Urban Levee Evaluations (ULE) and Non-Urban Levee Evaluations (NULE) results that are not directly comparable because different evaluation methodologies were used for each project. The map is intended to show broadly which levee reaches are of relatively higher, medium, and lower concern, based on physical conditions of the levees. Levees shown as purple (higher concern) on the map generally display more performance problems than those shown in green (lower concern). Results do not reflect economic or life safety consequences of flooding, which are key factors in planning system repairs and improvements.

Levee Status Factors were evaluated in the Flood Control System Status Report (FCSSR) according to the following status factors:

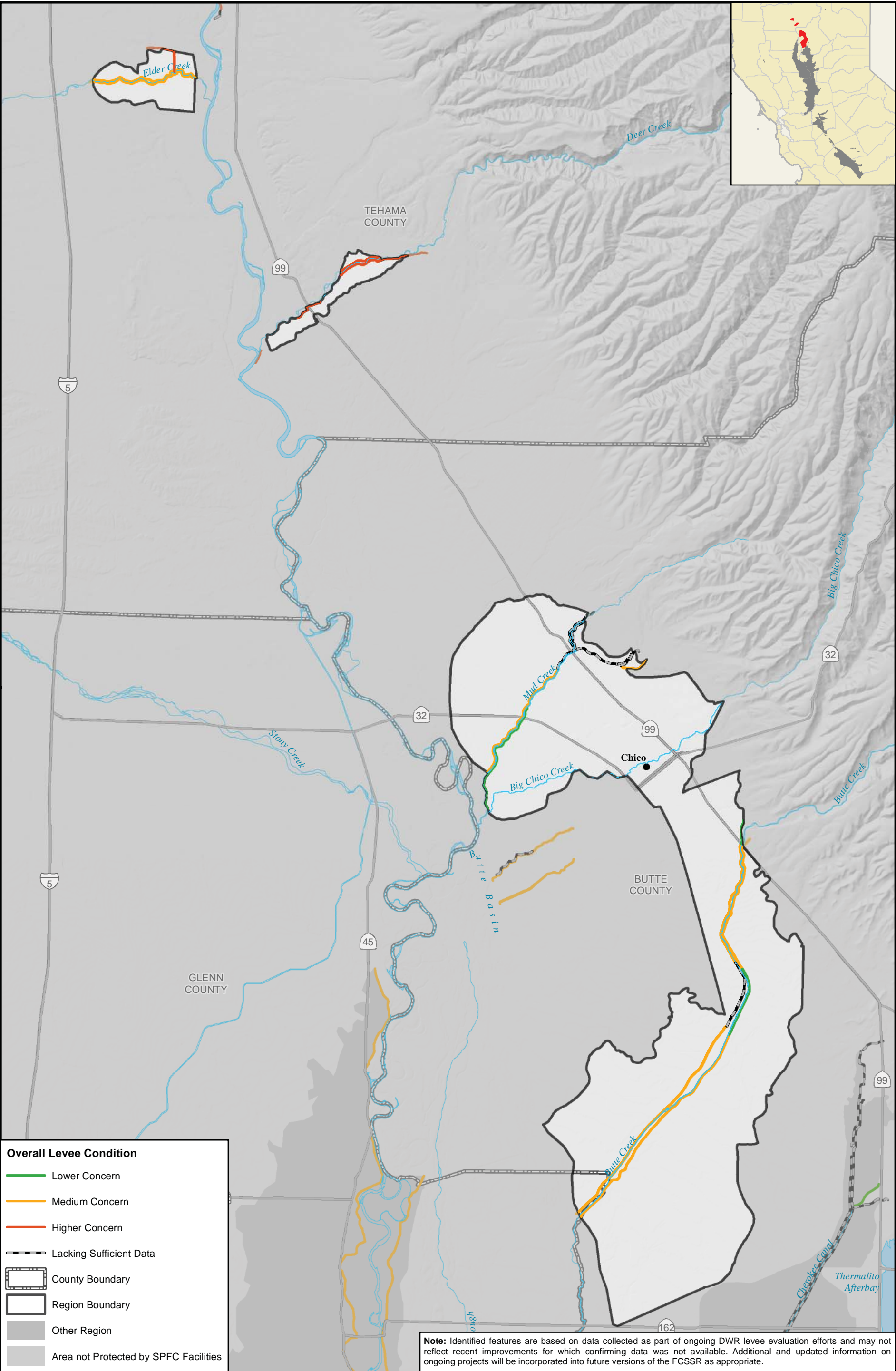
- Inadequate Levee Geometry (Levee Geometry Check) – Levee crest elevations that are too low, crest widths that are too narrow, and levee side slopes that are too steep can reduce levee stability and lead to failure.
- Seepage – Seepage under a levee foundation or through a levee can reduce levee stability and lead to failure.
- Structural Instability – Slides, sloughs, slope depressions or bulges can reduce levee stability and lead to failure.

- Erosion – Levee and bank erosion can directly reduce levee cross sections and shorten seepage paths, leading to failure.
- Settlement – Levee settlement or land subsidence over years can result in levee crest elevations lower than designed, reducing freeboard or causing water to overtop a levee.
- Penetrations – Irrigation and drainage pipes, utilities, and other structures through levees may create seepage paths. Seepage along the penetrations, or through deteriorating penetrations, could wash away levee material and lead to failure. Lack of positive closure devices on pipes penetrating levees can also lead to localized flooding.
- Levee Vegetation – Vegetation on levees can interfere with floodfighting efforts and maintenance by reducing visibility and accessibility. The extent that levee vegetation impacts levee integrity is the subject of ongoing research.
- Rodent Damage – Burrowing animals can create holes in levees that can create seepage paths and lead to levee failure.
- Encroachments – Encroachments (such as debris, fences, and structures) on SPFC facilities can interfere with floodfighting efforts and maintenance and, in some cases, reduce levee stability, which can lead to levee failure.

Note: Identified features are based on data collected as part of ongoing DWR levee evaluation efforts and may not reflect recent improvements for which confirmed data was not available.



The overall physical condition of SPFC levees is based on Urban Levee Evaluations and Non-Urban Levee Evaluations, and inspections completed by Local Maintaining Agencies (LMA's) and DWR



1" = 3 miles

0 0.75 1.5 3 Miles

Datum: NAD 83 Projection: CA (Teale) Albers
Zone: N/A Units: meters
Sources: See Appendix for source citations

Regional Flood Management Planning

Upper Sacramento River

Overall Levee Conditions

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STATE OF CALIFORNIA

Prepared By: K. Miller
Date: May 10, 2013
File: Z:\Projects\109146\Map11_Hazard_overall.mxd

MAP 11A

Map 11B – Overall Levee Conditions

The overall physical condition of SPFC levees is shown on this map. It includes a simplified representation of levee conditions, based on Urban Levee Evaluations (ULE) and Non-Urban Levee Evaluations (NULE) results that are not directly comparable because different evaluation methodologies were used for each project. The map is intended to show broadly which levee reaches are of relatively higher, medium, and lower concern, based on physical conditions of the levees. Levees shown as purple (higher concern) on the map generally display more performance problems than those shown in green (lower concern). Results do not reflect economic or life safety consequences of flooding, which are key factors in planning system repairs and improvements.

Levee Status Factors were evaluated in the Flood Control System Status Report (FCSSR) according to the following status factors:

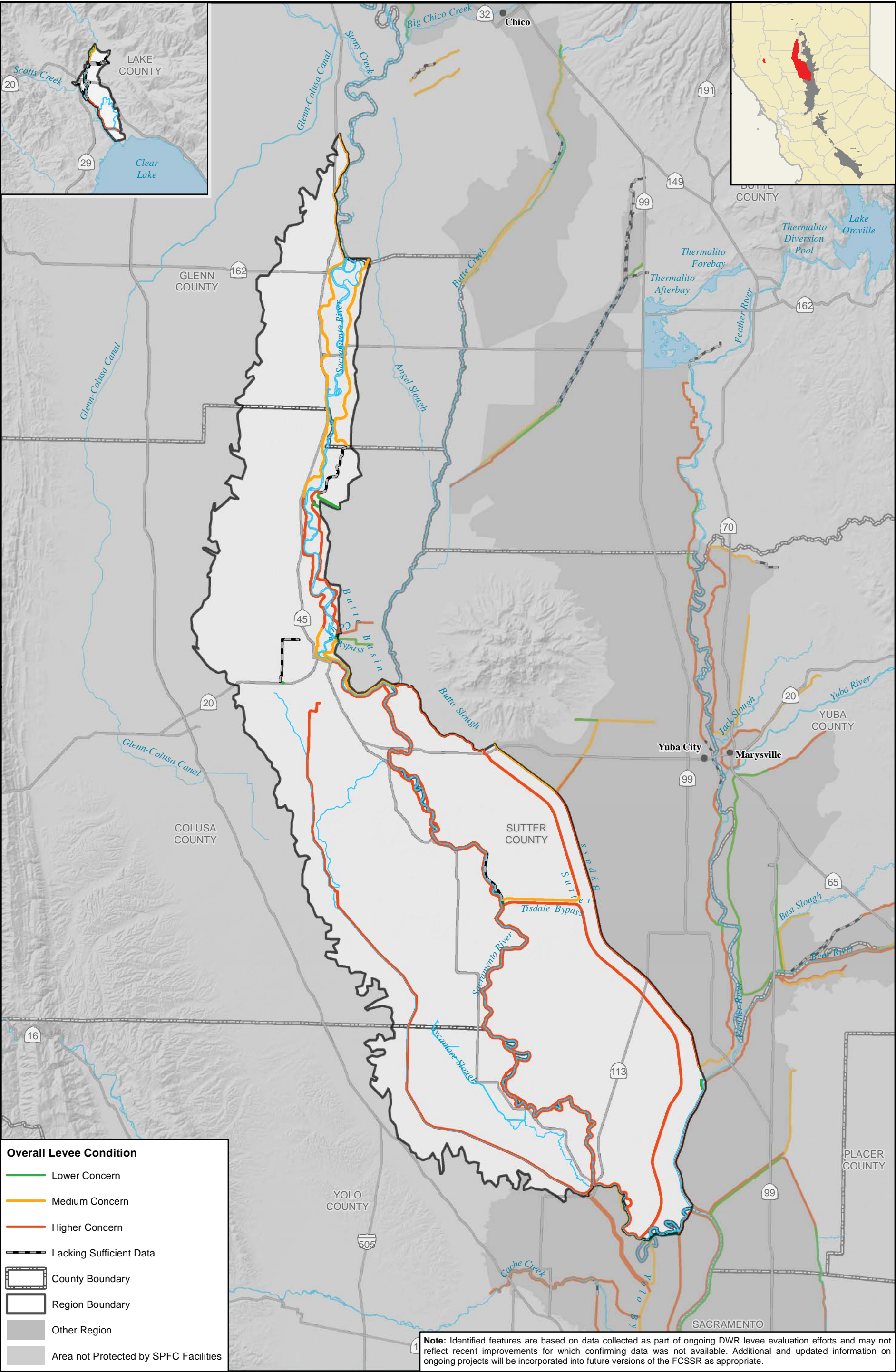
- Inadequate Levee Geometry (Levee Geometry Check) – Levee crest elevations that are too low, crest widths that are too narrow, and levee side slopes that are too steep can reduce levee stability and lead to failure.
- Seepage – Seepage under a levee foundation or through a levee can reduce levee stability and lead to failure.
- Structural Instability – Slides, sloughs, slope depressions or bulges can reduce levee stability and lead to failure.

- Erosion – Levee and bank erosion can directly reduce levee cross sections and shorten seepage paths, leading to failure.
- Settlement – Levee settlement or land subsidence over years can result in levee crest elevations lower than designed, reducing freeboard or causing water to overtop a levee.
- Penetrations – Irrigation and drainage pipes, utilities, and other structures through levees may create seepage paths. Seepage along the penetrations, or through deteriorating penetrations, could wash away levee material and lead to failure. Lack of positive closure devices on pipes penetrating levees can also lead to localized flooding.
- Levee Vegetation – Vegetation on levees can interfere with floodfighting efforts and maintenance by reducing visibility and accessibility. The extent that levee vegetation impacts levee integrity is the subject of ongoing research.
- Rodent Damage – Burrowing animals can create holes in levees that can create seepage paths and lead to levee failure.
- Encroachments – Encroachments (such as debris, fences, and structures) on SPFC facilities can interfere with floodfighting efforts and maintenance and, in some cases, reduce levee stability, which can lead to levee failure.

Note: Identified features are based on data collected as part of ongoing DWR levee evaluation efforts and may not reflect recent improvements for which confirmed data was not available.



The overall physical condition of SPFC levees is based on Urban Levee Evaluations and Non-Urban Levee Evaluations, and inspections completed by Local Maintaining Agencies (LMA's) and DWR



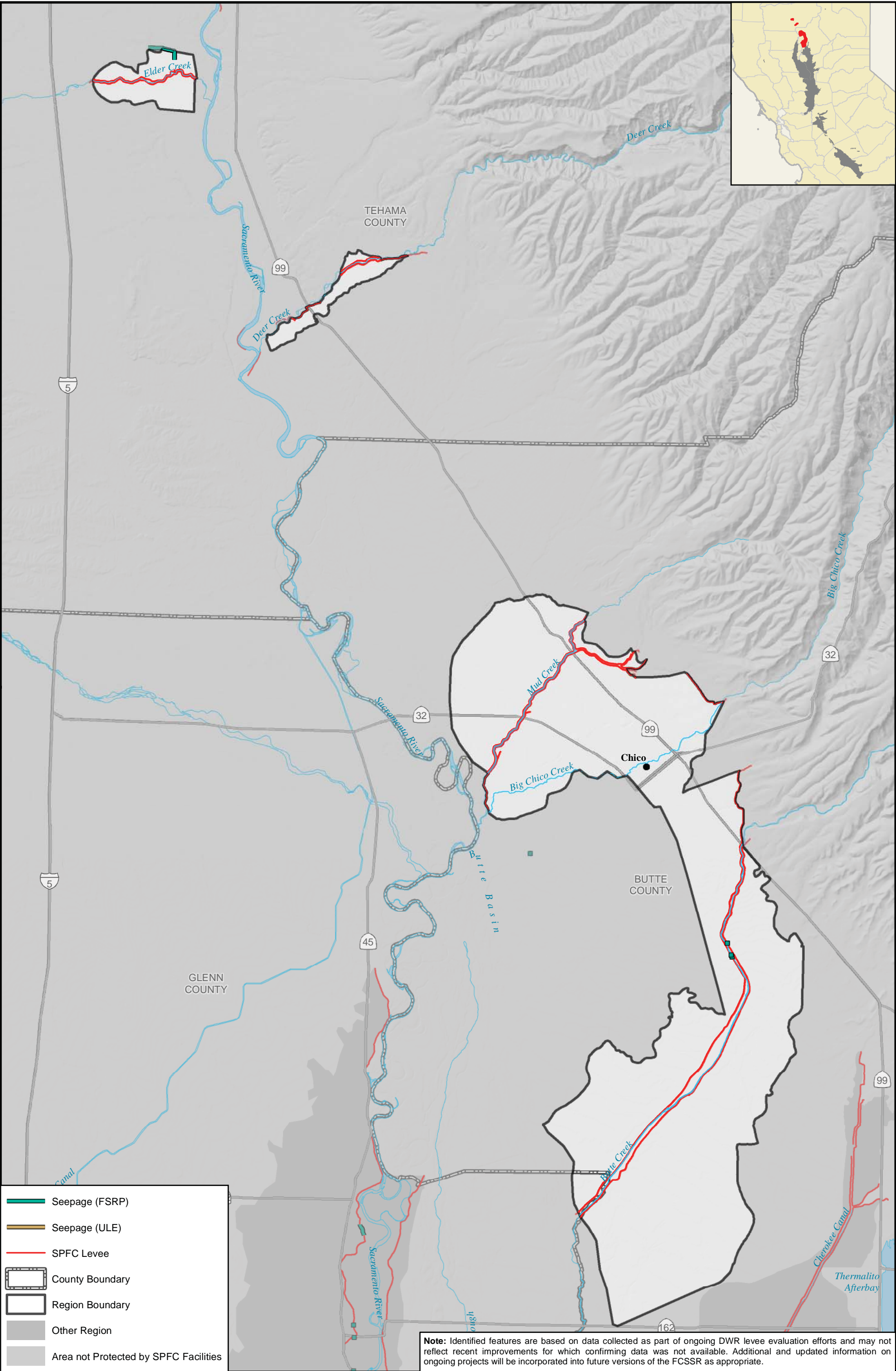
Map 12A – Seepage Past Performance Problems

This map shows the seepage past performance problems based on information collected as part of ongoing DWR levee evaluation efforts, Urban Levee Evaluation (ULE) program and the Flood System Repair Program

(FSRP), and may not reflect recent improvements for which confirming data was not available. This information was originally presented in the *Flood Control System Status Report (FCSSR)* (December 2011).



An example of seepage



1" = 3 miles

0

0.75

1.5

3

Miles

N

Datum: NAD 83

Projection: CA (Teale) Albers

Zone: N/A

Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

Upper Sacramento River
Seepage Past Performance Problems

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STATE OF CALIFORNIA

Prepared By: K. Miller

Date: May 10, 2013

File: Z:\Projects\109146\Map12_Seepage.mxd

MAP 12A

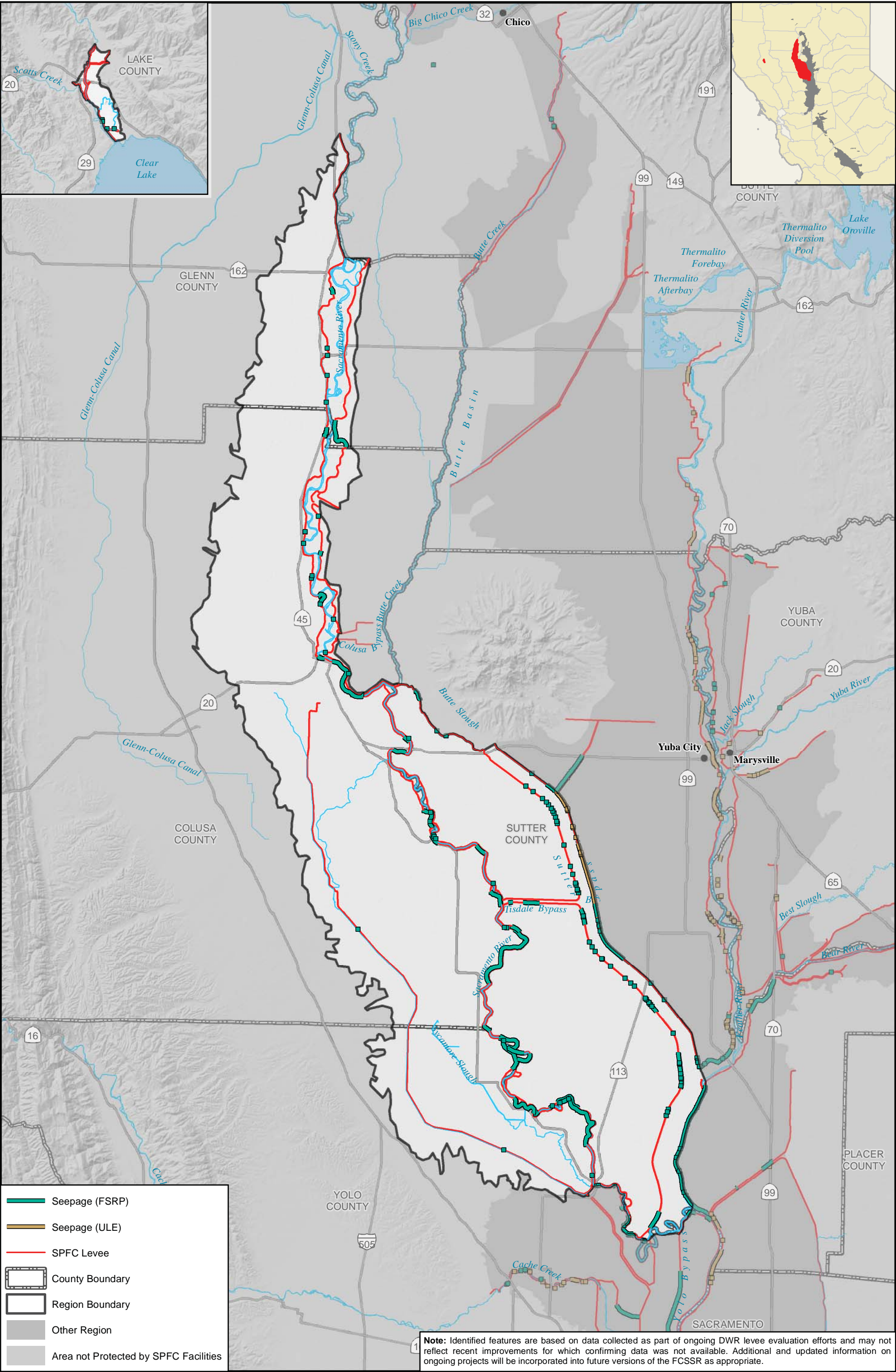
Map 12B – Seepage Past Performance Problems

This map shows the seepage past performance problems based on information collected as part of ongoing DWR levee evaluation efforts, Urban Levee Evaluation (ULE) program and the Flood System Repair Program

(FSRP), and may not reflect recent improvements for which confirming data was not available. This information was originally presented in the *Flood Control System Status Report (FCSSR)* (December 2011).



An example of seepage

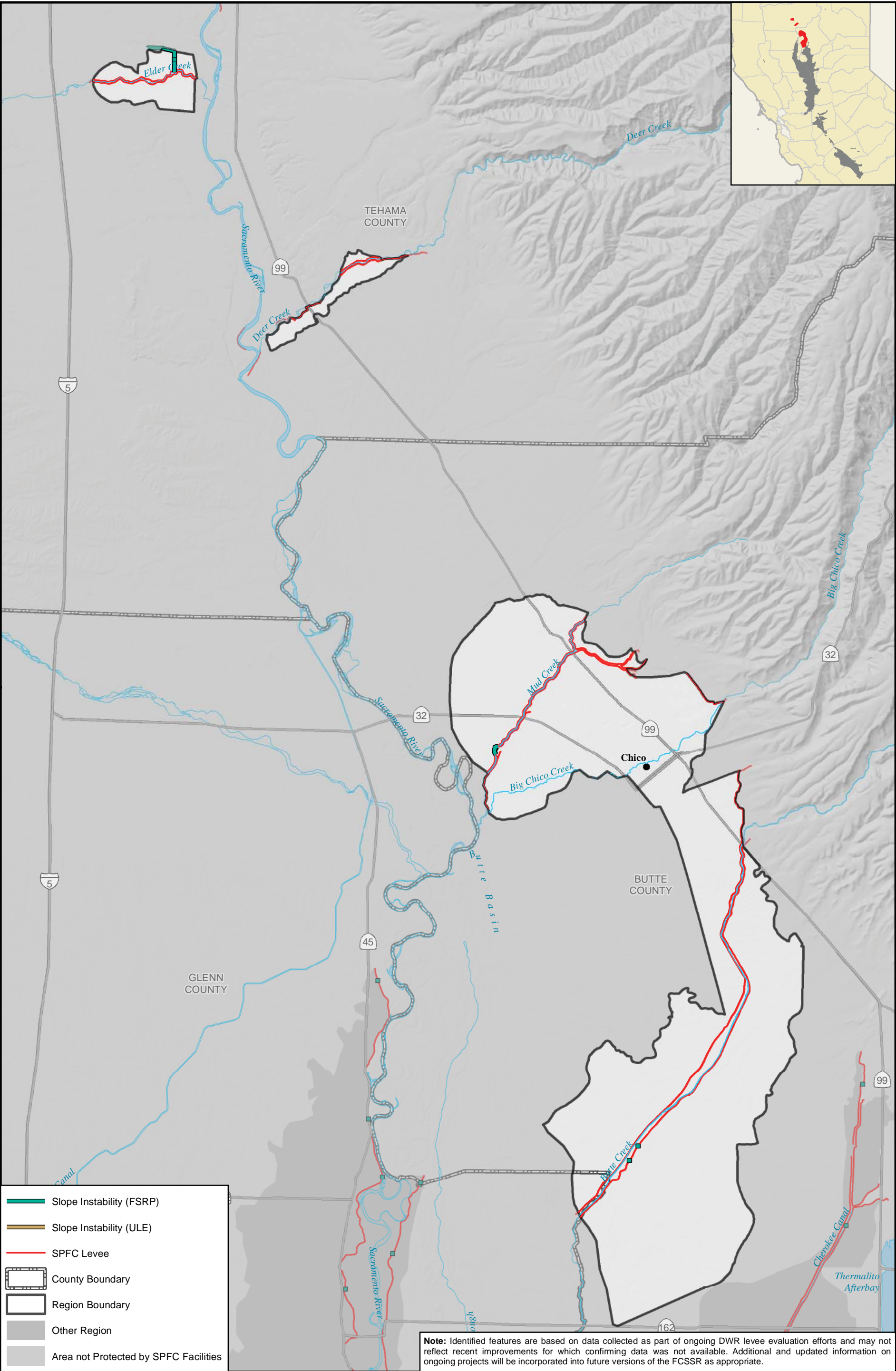


Map 13A – Slope Instability Past Performance Problems

This map shows the slope instability past performance problems based on information collected as part of ongoing DWR levee evaluation efforts, Urban Levee Evaluation (ULE) program and the Flood System Repair Program (FSRP), and may not reflect recent improvements for which confirming data was not available. This information was originally presented in the *Flood Control System Status Report (FCSSR)* (December 2011).



An example of slope instability



1" = 3 miles

0

1

2

4

Miles

N

Datum: NAD 83
Zone: N/A
Sources: See Appendix for source citations

Projection: CA (Teale) Albers
Units: meters

Regional Flood Management Planning

Upper Sacramento River
Slope Instability Past Performance Problems

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Prepared By: K. Miller

Date: May 10, 2013

File: Z:\Projects\109146\Map13_SlopeInstability.mxd

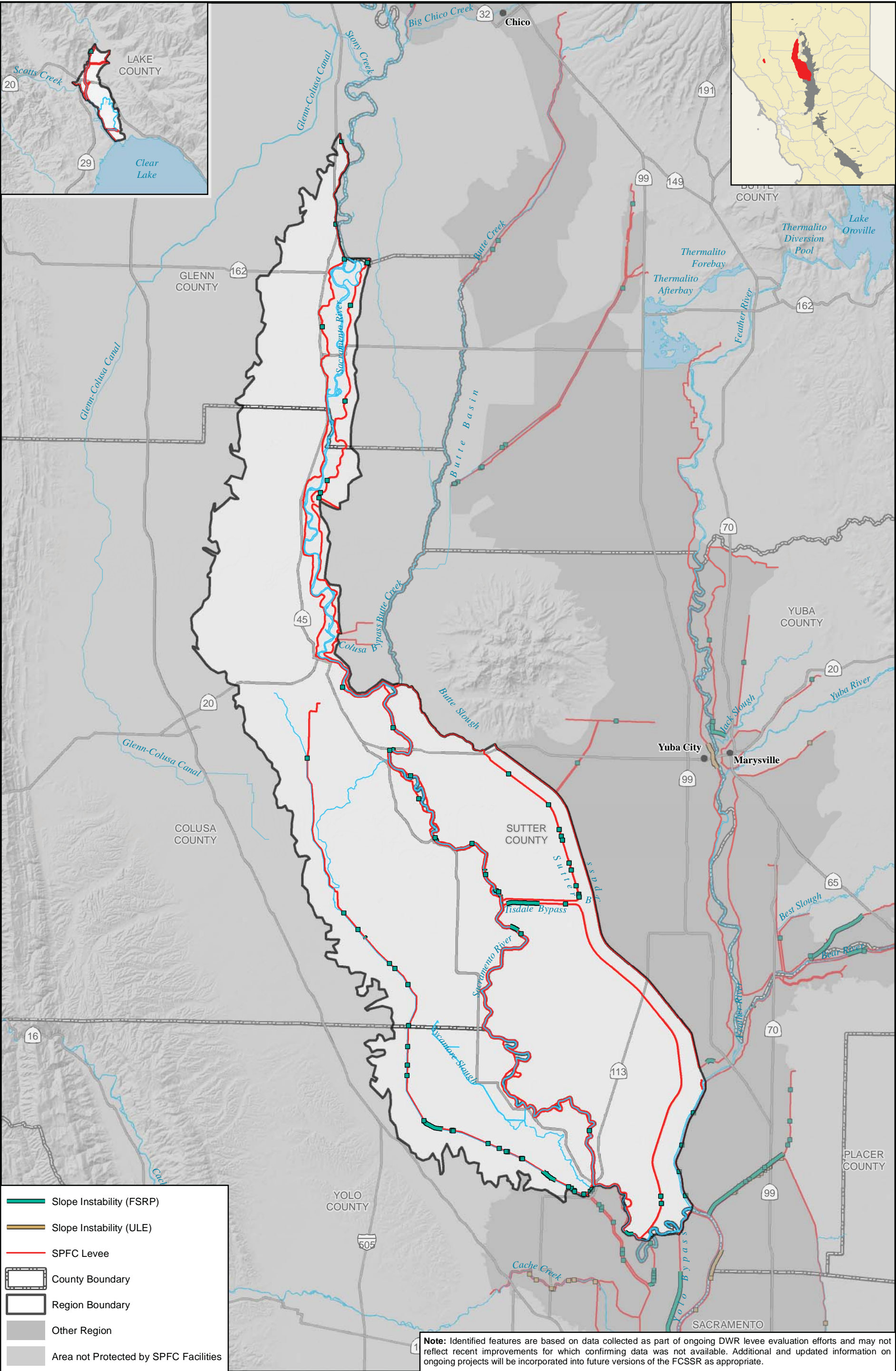
MAP 13A

Map 13B – Slope Instability Past Performance Problems

This map shows the slope instability past performance problems based on information collected as part of ongoing DWR levee evaluation efforts, Urban Levee Evaluation (ULE) program and the Flood System Repair Program (FSRP), and may not reflect recent improvements for which confirming data was not available. This information was originally presented in the *Flood Control System Status Report (FCSSR)* (December 2011).



An example of slope instability



1" = 5 miles

0 1 2 4 Miles

Datum: NAD 83 Projection: CA (Teale) Albers
Zone: N/A Units: meters
Sources: See Appendix for source citations

Regional Flood Management Planning

Mid-Sacramento River

Slope Instability Past Performance Problems

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Prepared By: K. Miller
Date: May 10, 2013
File: Z:\Projects\109146\Map13_SlopeInstability.mxd

MAP 13B

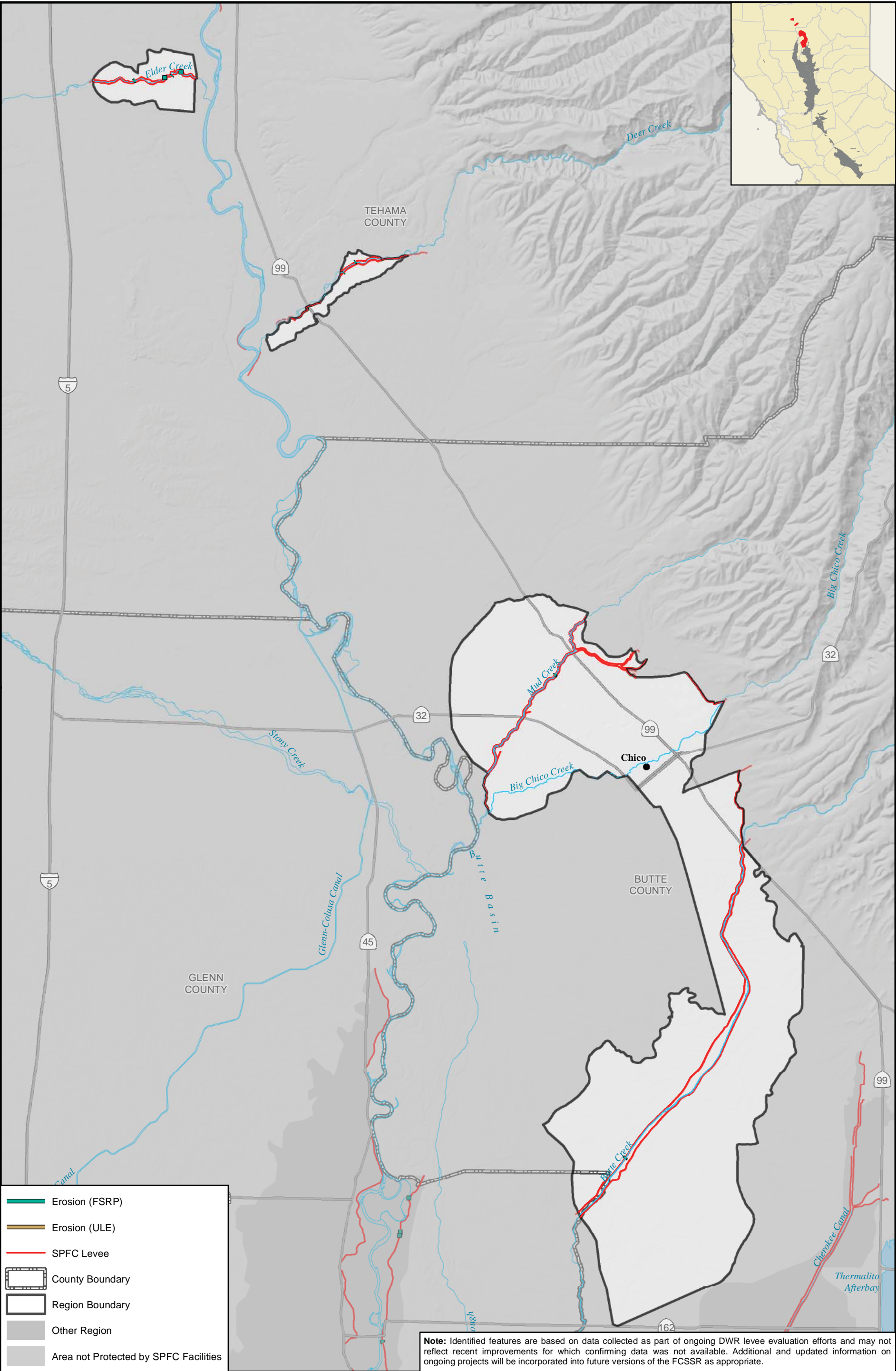
Map 14A – Erosion Past Performance Problems

This map shows the erosion past performance problems based on information collected as part of ongoing DWR levee evaluation efforts, Urban

Levee Evaluation (ULE) program and the Flood System Repair Program (FSRP), and may not reflect recent improvements for which confirming data was not available. This information was originally presented in the *Flood Control System Status Report (FCSSR)* (December 2011).



An example of erosion



1" = 3 miles

0

1

2

4

Miles

N

Datum: NAD 83

Projection: CA (Teale) Albers

Zone: N/A

Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

Upper Sacramento River

Erosion Past Performance Problems

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Prepared By: K. Miller

Date: May 10, 2013

File: Z:\Projects\109146\Map14_Erosion.mxd

MAP 14A

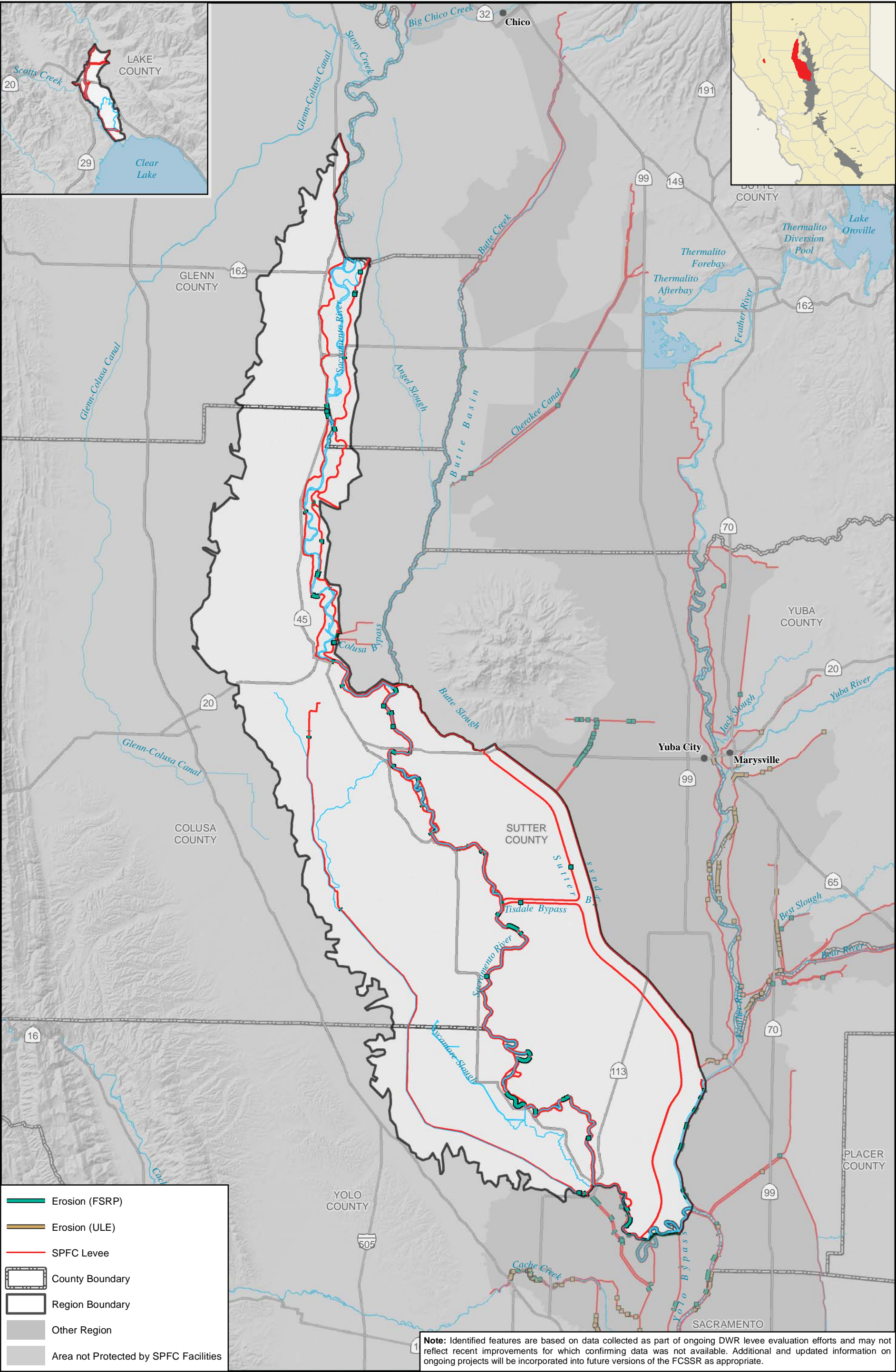
Map 14B – Erosion Past Performance Problems

This map shows the erosion past performance problems based on information collected as part of ongoing DWR levee evaluation efforts, Urban

Levee Evaluation (ULE) program and the Flood System Repair Program (FSRP), and may not reflect recent improvements for which confirming data was not available. This information was originally presented in the *Flood Control System Status Report (FCSSR)* (December 2011).



An example of erosion



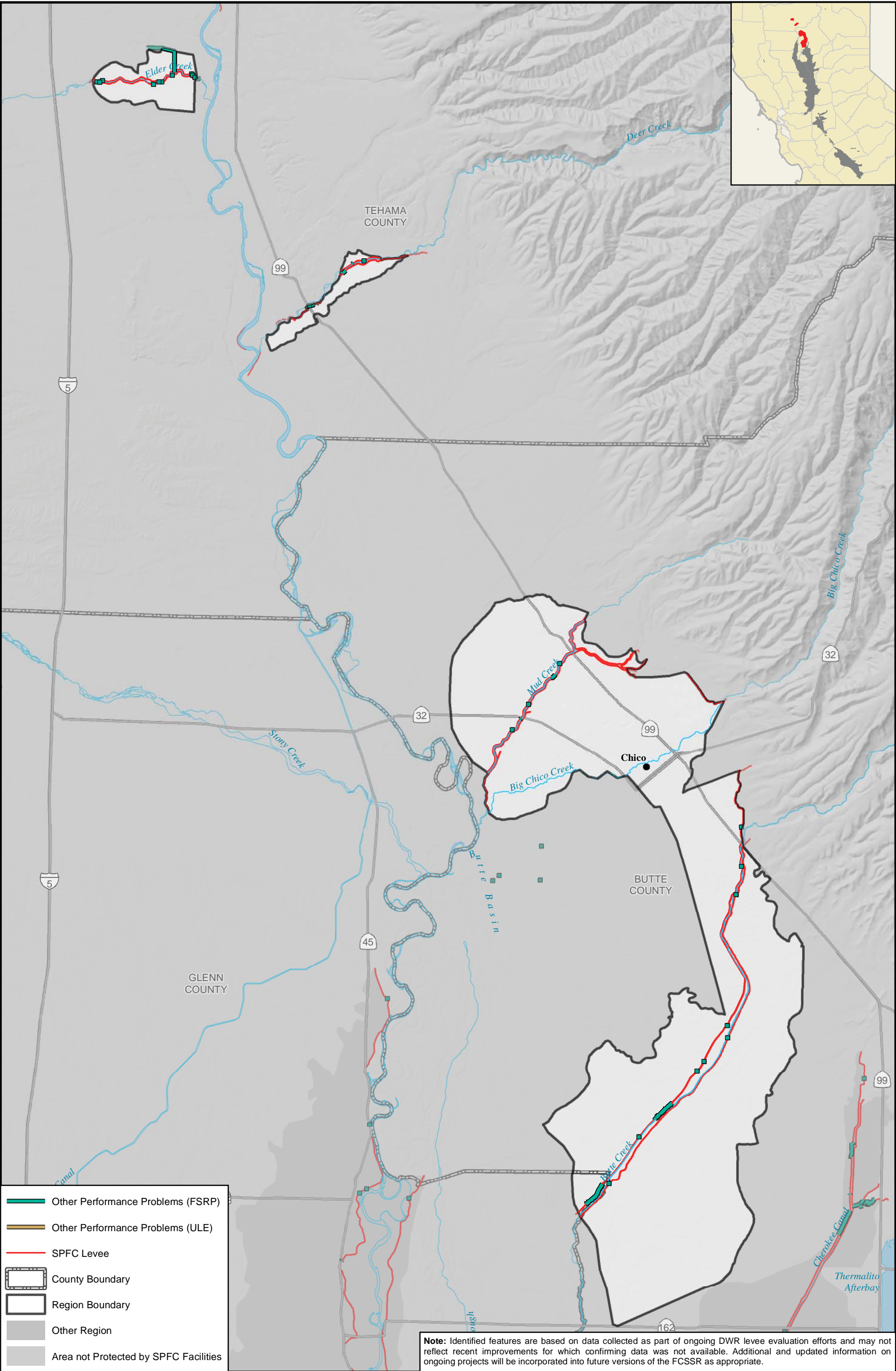
Map 15A – Other Past Performance Problems

This map shows information collected, outside of seepage, levee stability, and erosion issues, as part of ongoing DWR levee evaluation efforts, Urban Levee Evaluation (ULE) program and the Flood System Repair Program (FSRP).

The “other” performance problem category generally includes – historical overtopping, breach occurrences, relief cuts, subsidence, burrows, and anthropogenic damage. This data may not reflect recent improvements for which confirming data was not available. This information was originally presented in the *Flood Control System Status Report (FCSSR)* (December 2011).



An example of a levee breach



1" = 3 miles

00.751.53

Miles

N

Datum: NAD 83
Zone: N/A
Sources: See Appendix for source citations

Projection: CA (Teale) Albers
Units: meters

Regional Flood Management Planning

Upper Sacramento River
Other Past Performance Problems

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Prepared By: K. Miller
Date: May 10, 2013
File: Z:\Projects\109146\Map15_OtherProblems.mxd

MAP 15A

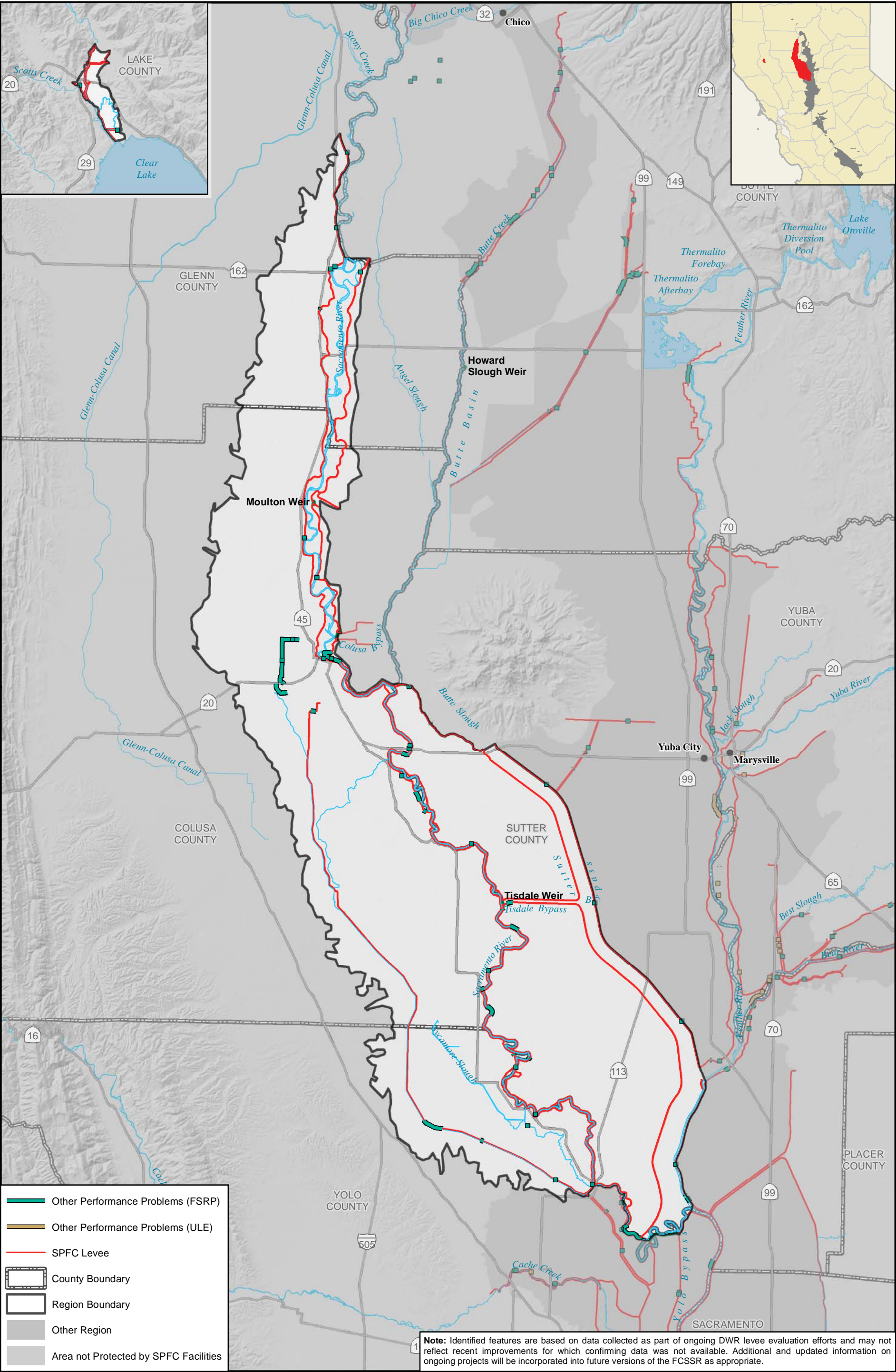
Map 15B – Other Past Performance Problems

This map shows information collected, outside of seepage, levee stability, and erosion issues, as part of ongoing DWR levee evaluation efforts, Urban Levee Evaluation (ULE) program and the Flood System Repair Program (FSRP).

The “other” performance problem category generally includes – historical overtopping, breach occurrences, relief cuts, subsidence, burrows, and anthropogenic damage. This data may not reflect recent improvements for which confirming data was not available. This information was originally presented in the *Flood Control System Status Report (FCSSR)* (December 2011).



An example of a levee breach



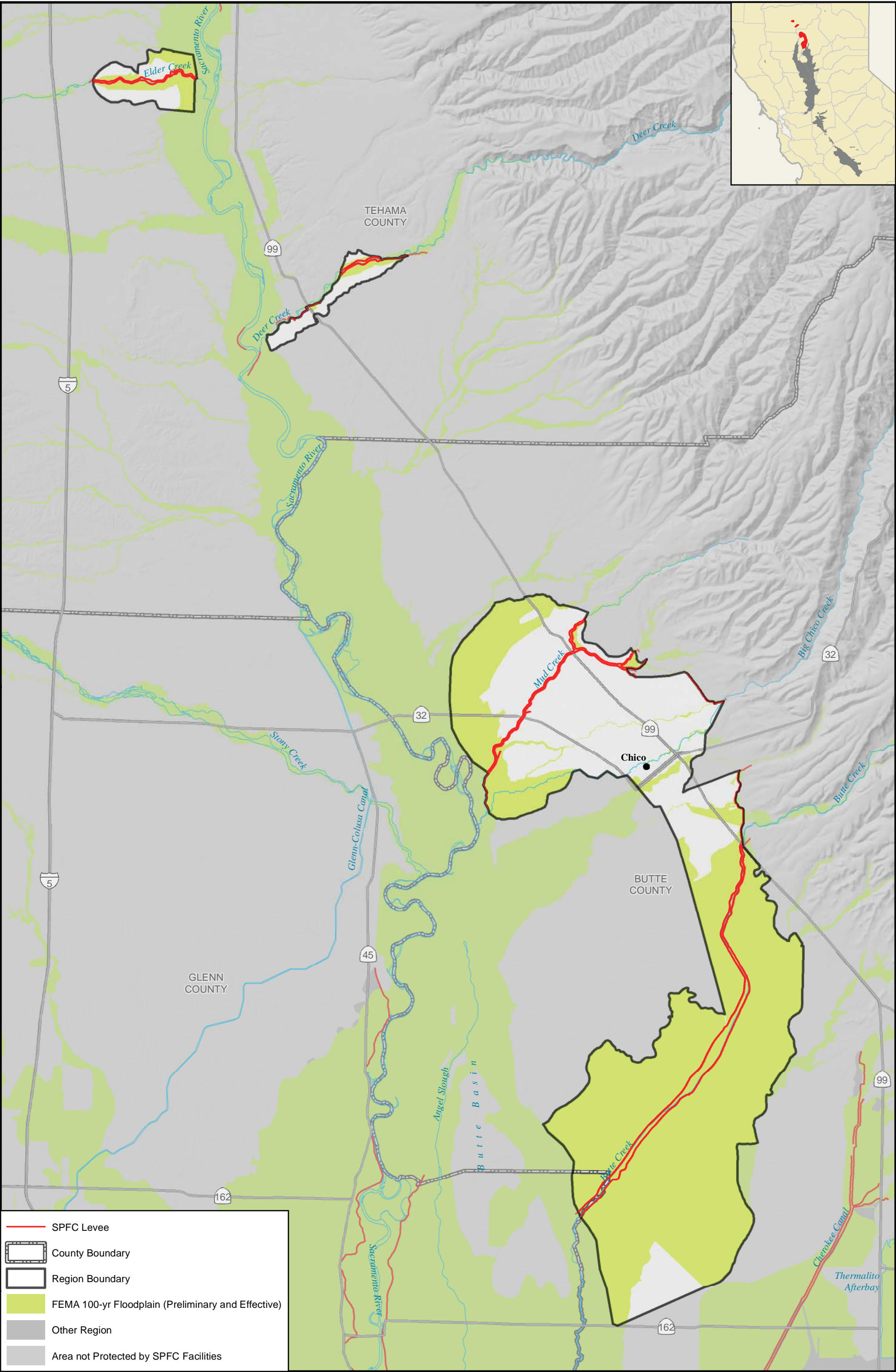
Map 16A – FEMA 100-Year Floodplain

FEMA flood zones are geographic areas that the Federal Emergency Management Agency (FEMA) has defined according to varying levels of flood risk. These zones are depicted on a community’s Flood Insurance Rate Map (FIRM). The FEMA 100-year floodplain represents the flood zones that are

subject to flooding from the 1% annual chance flood. The FEMA 100-year floodplains were obtained from FEMA in February 2013. For the latest floodplain information, please visit FEMA’s Map Service Center at <http://msc.fema.gov/>. The FEMA effective floodplains are shown on FEMA’s Effective Flood Insurance Rate Maps and used for regulatory purposes.



Critical erosion at Butte Creek, 1997



SPFC Levee

County Boundary

Region Boundary

FEMA 100-yr Floodplain (Preliminary and Effective)

Other Region

Area not Protected by SPFC Facilities

1" = 3 miles

0

1

2

4

Miles

N

Datum: NAD 83

Projection: CA (Teale) Albers

Zone: N/A

Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

Upper Sacramento River
FEMA 100-Year Floodplain

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Prepared By: K. Miller

Date: May 10, 2013

File: Z:\Projects\109146\Map16_FloodInundation_FEMA.mxd

MAP 16A

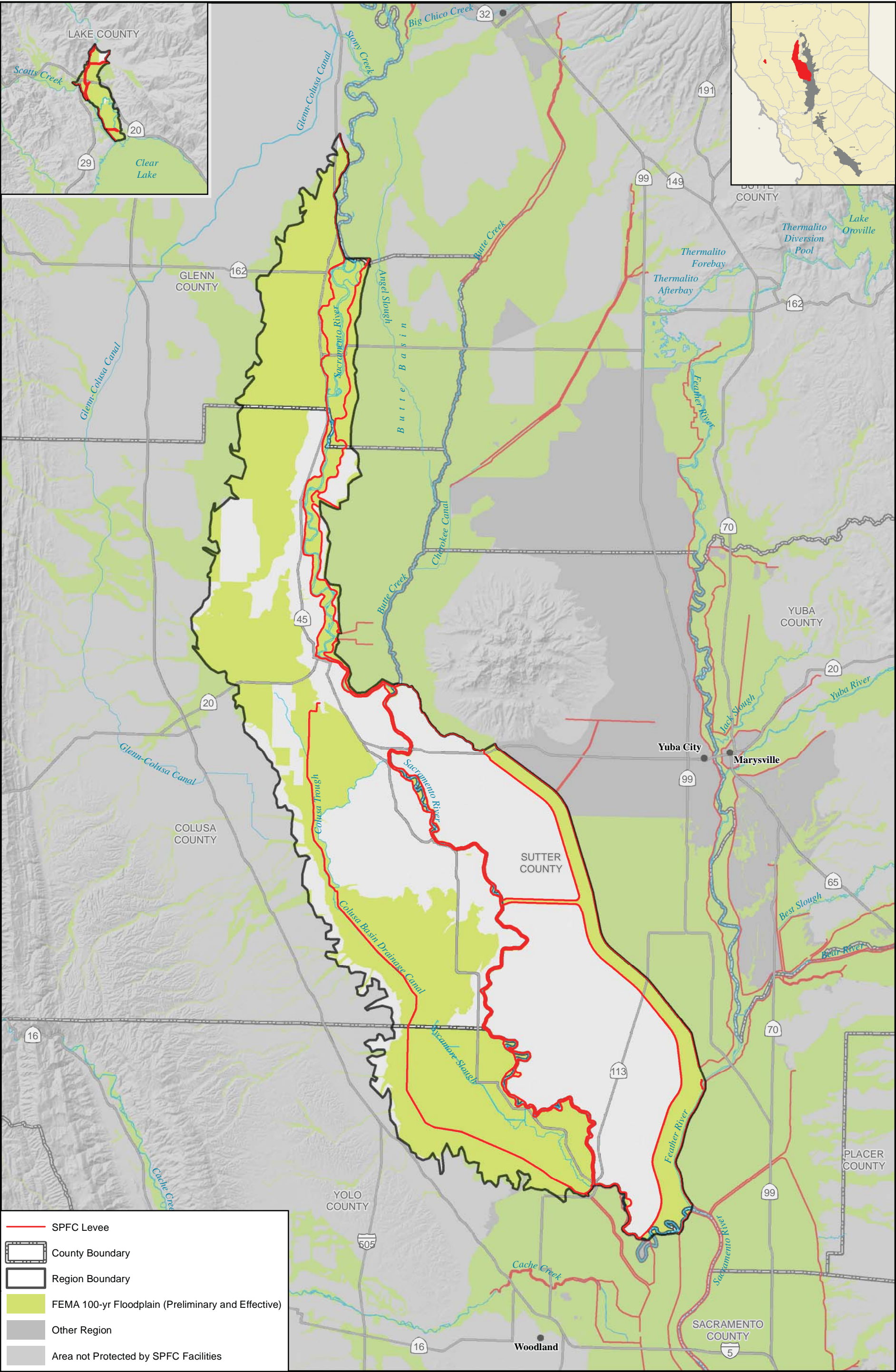
Map 16B – FEMA 100-Year Floodplain

FEMA flood zones are geographic areas that the Federal Emergency Management Agency (FEMA) has defined according to varying levels of flood risk. These zones are depicted on a community’s Flood Insurance Rate Map (FIRM). The FEMA 100-year floodplain represents the flood zones that are

subject to flooding from the 1% annual chance flood. The FEMA 100-year floodplains were obtained from FEMA in February 2013. For the latest floodplain information, please visit FEMA’s Map Service Center at <http://msc.fema.gov/>. The FEMA effective floodplains are shown on FEMA’s Effective Flood Insurance Rate Maps and used for regulatory purposes.



1997 flood in Meridian City



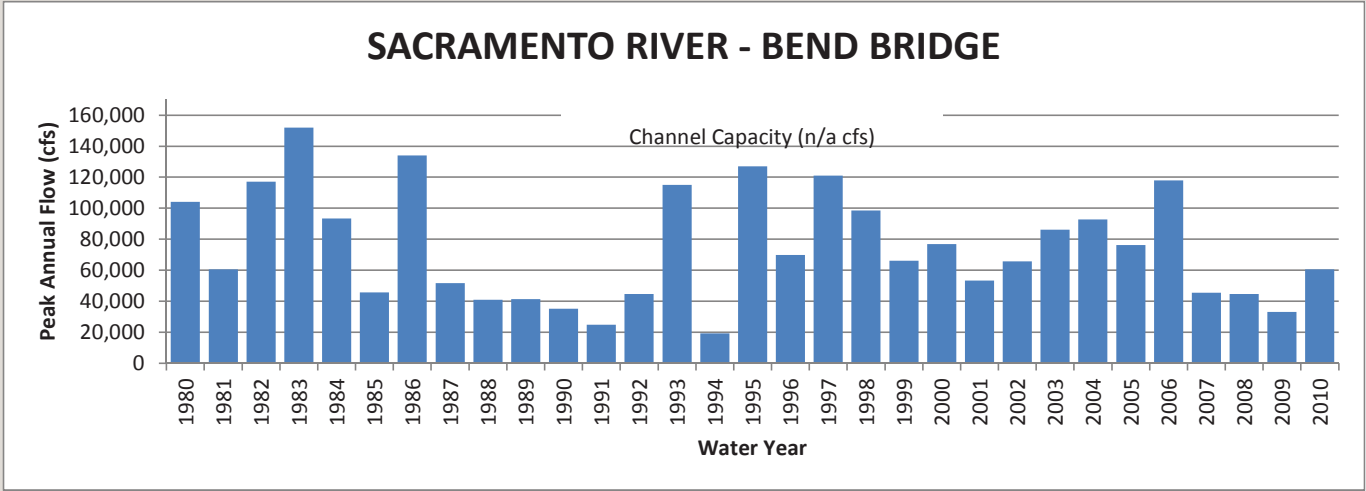
Map 17A – Channel Capacities and Flood Forecast Monitoring Network

Conveyance capacity is defined as the maximum rate of flowing water, usually expressed in cubic feet per second (cfs), that a river, canal, or bypass can carry without exceeding a threshold value such as flood discharge, or without using the freeboard distance from the top of a levee.

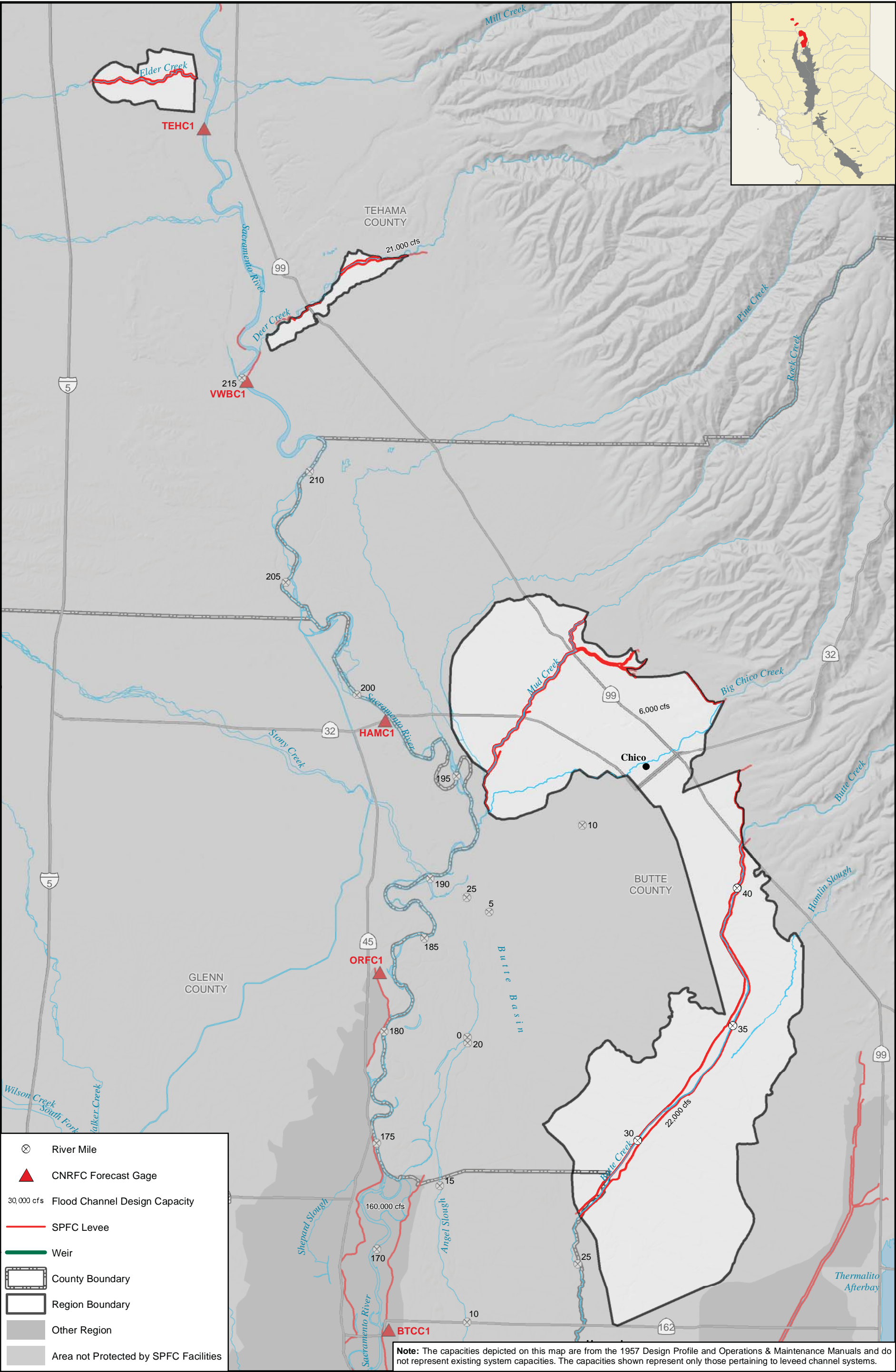
Design Channel Capacity - Design channel capacities were calculated from the design profiles based on steady-state, uniform flow hydraulic computations of historical floods using data available at the time. Therefore, design channel capacities were based on a very limited hydrological record, were highly dependent on the boundary conditions assumed, and did not consider variations in flow and depth with respect to time and distance. Furthermore, the design profiles could not account for changes in vegetation and sedimentation patterns within the channels, or flood system improvements that have taken place after the historical floods used to derive the design flood flow capacities. For example, the 1955 historical flood used to determine the 1955 design profile for the San Joaquin River downstream from the Merced River confluence occurred before construction of the San Joaquin River bypass system.

Flood Monitoring Network - Under the authority of the California Water Code Section 236, the River Forecasting Section works with the National Weather Service’s California-Nevada River Forecast Center (CNRFC) to provide year-round daily forecasts of reservoir inflows, river flows, and water levels throughout California and in parts of Nevada. These forecasts are used by the Flood Operations Branch and the National Weather Service to determine the level of joint Federal-State flood response activation and operations. During high water events, Federal and State river forecasters work around the clock to update their forecasts and monitor real-time changes in California and Nevada’s larger rivers and estuaries.

Gages are located throughout the Sacramento and San Joaquin River Systems. The peak annual flow is shown for selected gages for the 1980 to 2010 period where historical flow data was readily available. In the Upper Sacramento River Region the peak annual flows at the Sacramento River – Bend Bridge forecast point is shown in the bar chart below.



Levee Near Hamilton City



1" = 3 miles

0

1

2

4

Miles

N

Datum: NAD 83

Projection: CA (Teale) Albers

Zone: N/A

Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

Upper Sacramento River

Channel Capacities and Flood

Forecast Monitoring Network

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STATE OF CALIFORNIA

Prepared By: K. Miller

Date: May 10, 2013

File: Z:\Projects\109146\Map17_ChannelCapacities.mxd

MAP 17A

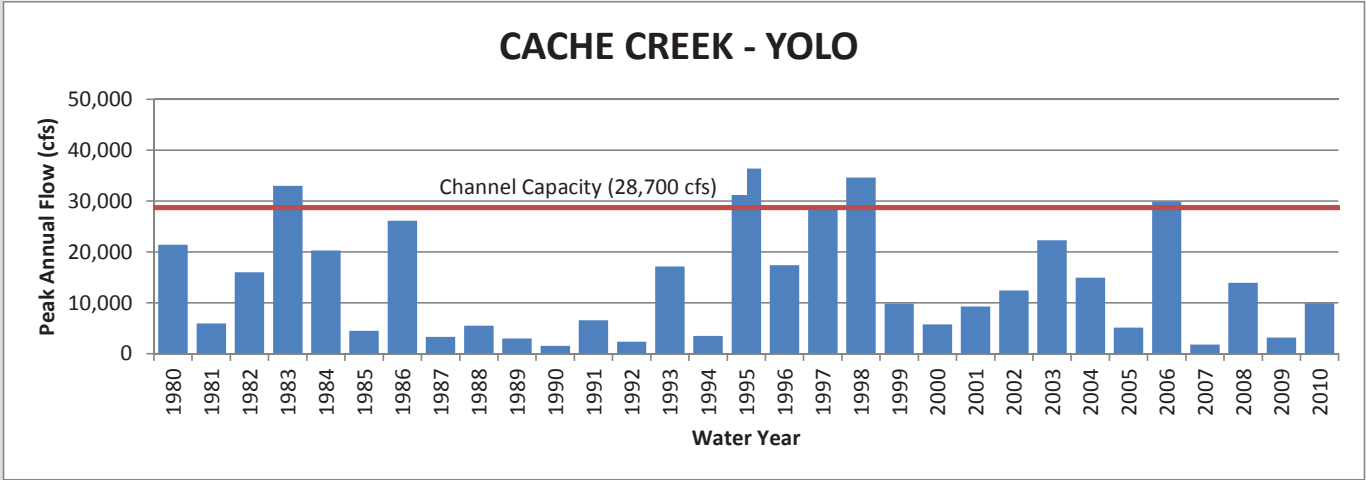
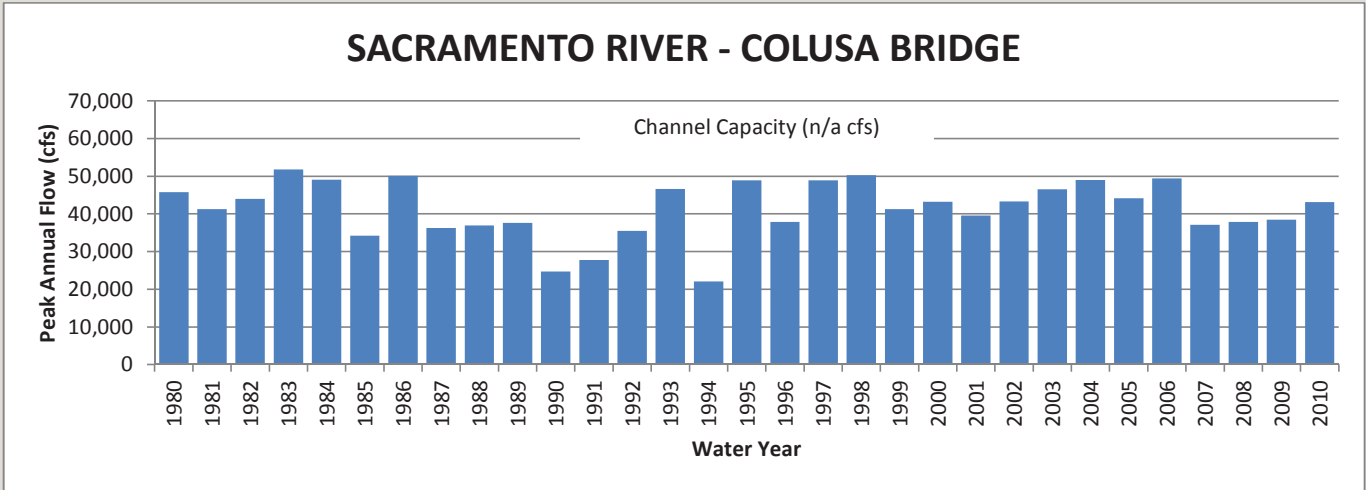
Map 17B – Channel Capacities and Flood Forecast Monitoring Network

Conveyance capacity is defined as the maximum rate of flowing water, usually expressed in cubic feet per second (cfs), that a river, canal, or bypass can carry without exceeding a threshold value such as flood discharge, or without using the freeboard distance from the top of a levee.

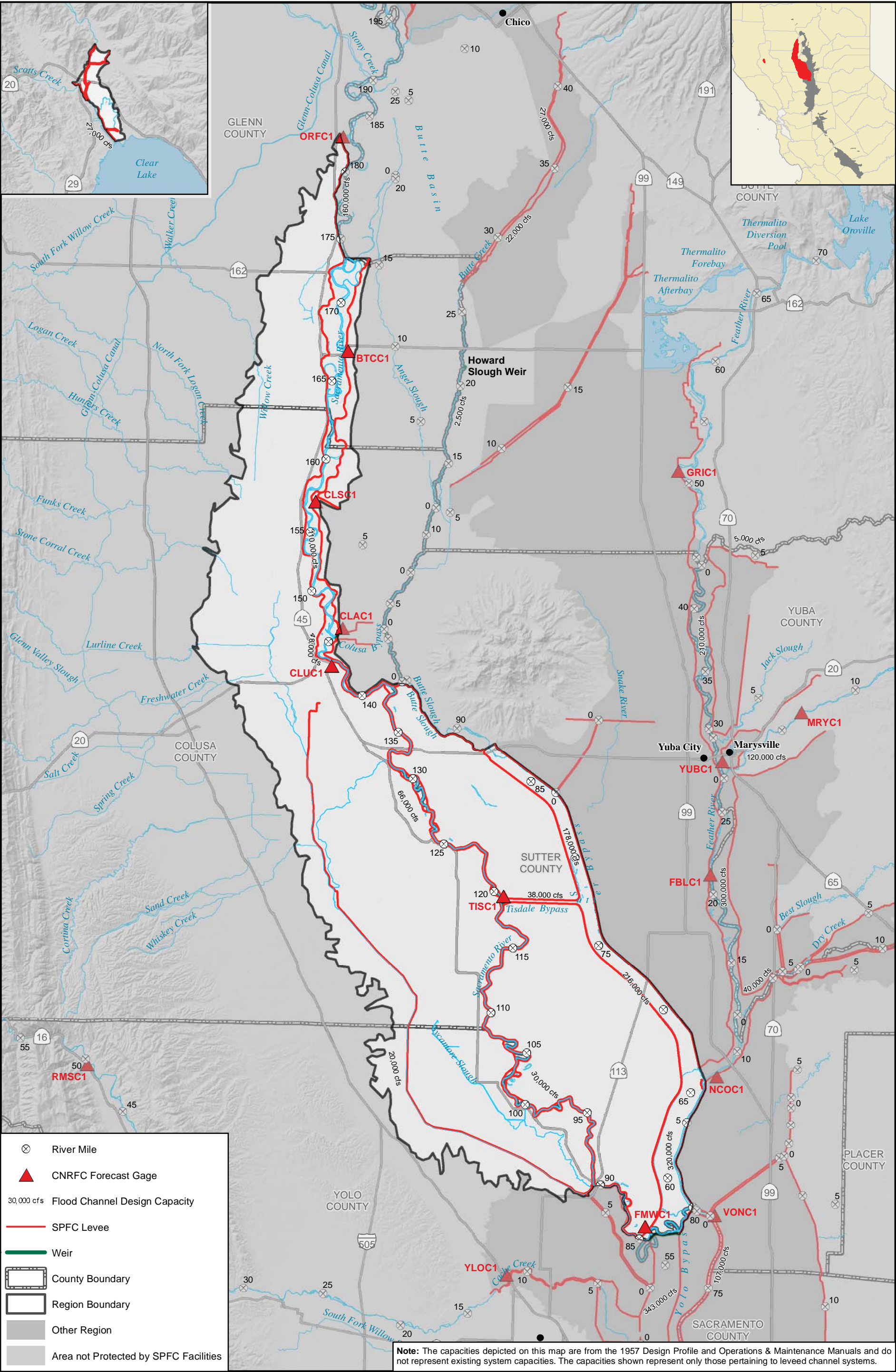
Design Channel Capacity - Design channel capacities were calculated from the design profiles based on steady-state, uniform flow hydraulic computations of historical floods using data available at the time. Therefore, design channel capacities were based on a very limited hydrological record, were highly dependent on the boundary conditions assumed, and did not consider variations in flow and depth with respect to time and distance. Furthermore, the design profiles could not account for changes in vegetation and sedimentation patterns within the channels, or flood system improvements that have taken place after the historical floods used to derive the design flood flow capacities. For example, the 1955 historical flood used to determine the 1955 design profile for the San Joaquin River downstream from the Merced River confluence occurred before construction of the San Joaquin River bypass system.

Flood Monitoring Network - Under the authority of the California Water Code Section 236, the River Forecasting Section works with the National Weather Service’s California-Nevada River Forecast Center (CNRFC) to provide year-round daily forecasts of reservoir inflows, river flows, and water levels throughout California and in parts of Nevada. These forecasts are used by the Flood Operations Branch and the National Weather Service to determine the level of joint Federal-State flood response activation and operations. During high water events, Federal and State river forecasters work around the clock to update their forecasts and monitor real-time changes in California and Nevada’s larger rivers and estuaries.

Gages are located throughout the Sacramento and San Joaquin River Systems. The peak annual flow is shown for selected gages for the 1980 to 2010 period where historical flow data was readily available. In the Mid-Sacramento River Region the peak annual flows at the Sacramento River – Colusa Bridge and Cache Creek – Yolo forecast points are shown in the bar charts below.



Trees along the Floodway



1" = 5 miles

0

1

2

4

Miles

N

Datum: NAD 83

Projection: CA (Teale) Albers

Zone: N/A

Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

Mid-Sacramento River

Channel Capacities and Flood

Forecast Monitoring Network

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STATE OF CALIFORNIA

Prepared By: K. Miller

Date: May 10, 2013

File: Z:\Projects\109146\Map17_ChannelCapacities.mxd

MAP 17B

Map 18A – Managed Environmental Lands

This map shows the extent of lands that are currently being managed by federal, State, or private entities. The current mapped information is listed below:

- National Wildlife Refuge, USFWS, 2011.
 - » Description from metadata: “This data layer depicts the simplified boundaries of lands and waters administered by the U.S. Fish and Wildlife Service (USFWS) in North America, U.S. Trust Territories and Possessions. It includes only lands that are held by fee or secondary title by USFWS. The primary source for this information is the USFWS Realty program.”
- Department of Fish & Game Lands, DFG, 2011.
 - » This layer includes all of DFG (now Department of Fish and Wildlife) Owned and Operated Lands. These are only lands owned with fee title. The only lands shown on Map 13 are those designated as “Ecological Reserve” or “Wildlife Area”.
- The Nature Conservancy Lands, TNC, 2011.
 - » Description from metadata: “A spatial dataset of lands and waters that The Nature Conservancy has a legal interest in (such as a conservation easement or fee-simple ownership). Includes spatial data from TNC’s Conservation Lands System (CLS) database, which is the legal database of record for all TNC land transactions (fee, easement, lease and deed restrictions).”

Upper Sacramento River Region Managed Environmental Lands

Managed Land Type	Area (square miles)	Acres
National Wildlife Refuge (USFWS)	<1	1
Department of Fish and Wildlife Lands	<1	79
The Nature Conservancy Lands	<1	455

Described managed lands are those lands located within the region or adjacent to the region.

Butte Creek Canyon Ecological Reserve

Butte Creek Canyon Ecological Reserve is located east of the Upper Sacramento River Region Boundary, along Butte Creek. The reserve supports various riparian community types, including Great Valley Oak and Great Valley Cottonwood Riparian Forests. In addition, special-status species including western pond turtle and red-legged frog are found at the reserve.

Merrill’s Landing Wildlife Area

Merrill’s Landing Wildlife Area, managed by the California Department of Fish and Wildlife, is located along the Sacramento River, outside the Upper Sacramento River Region Boundary. Merrill’s Landing Wildlife Area is 296 acres of high terrace riparian habitat, contains a large river island, and supports a heron rookery as well as a diversity of bird and mammal species.

Nature Conservancy Land

The Nature Conservancy manages conservation easements throughout California. There are several conservation easements occurring intermittently along the Sacramento River, with the intent of protecting and preserving riparian habitat. In addition, portions of Nature Conservancy lands occur within the Upper Sacramento River Region Boundary, north of the town of Chico, and are associated with Deer Creek.

Sacramento River Wildlife Area

The Sacramento River Wildlife Area is composed of approximately 3,770 acres of riparian habitat located along a seventy-mile reach of the Sacramento River. The Sacramento River Wildlife Area is managed by the California Department of Fish and Wildlife and occurs outside of the Upper Sacramento River Region Boundary.

Sacramento River National Wildlife Refuge

The Sacramento River National Wildlife Refuge, managed by US Fish and Wildlife Service, is composed of 27 units (properties) along a 77-mile stretch of the Sacramento River between Red Bluff and Princeton. The units occur outside of the Upper Sacramento River Region Boundary. Refuge lands comprise 10,146 acres of riparian habitat, wetlands, uplands, and intensively managed walnut, almond, and prune orchards.

Stone Ridge Ecological Reserve

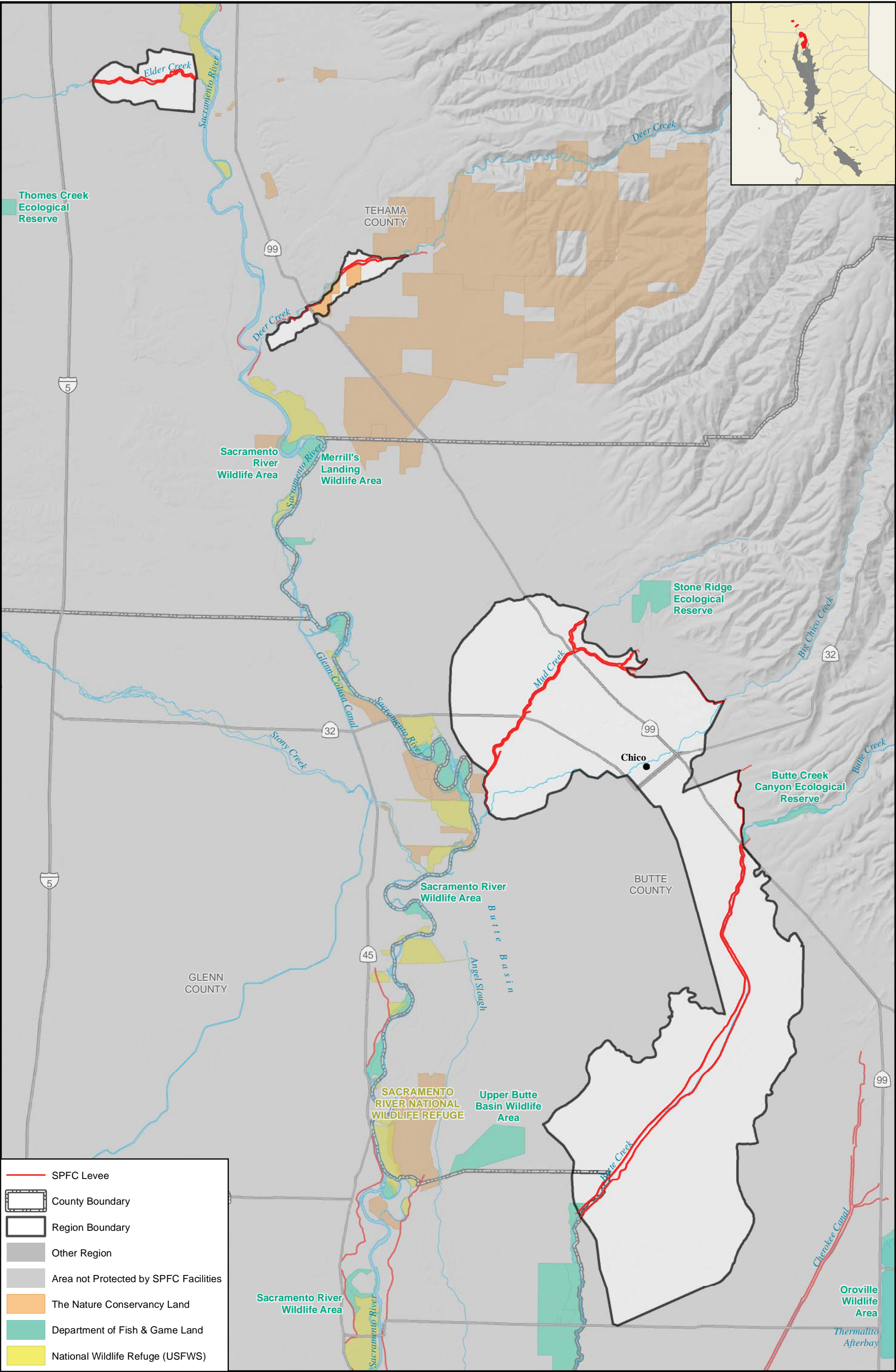
Stone Ridge Ecological Reserve is located in east of the Upper Sacramento River Region Boundary, and is managed by The California Department of Fish and Wildlife. The reserve consists of 754 acres, is proposed for designation as an ecological reserve for the protection of blue oak woodland, vernal pools and swales, clay flats, ephemeral and intermittent creeks, and associated uplands for mountain lion, black bear, western spadefoot, burrowing owl, ferruginous hawk, bald eagle, black-shouldered kite, the rare Adobe lily, the rare Butte County checkerbloom, Ahart’s paronychia, and the federally endangered Butte County meadowfoam.

Upper Butte Basin Wildlife Area

The Upper Butte Basin Wildlife Area, managed by The Department of Fish and Game, is located in Butte and Glenn Counties and is comprised of three units: Little Dry Creek, Howard Slough and Llano Seco for a total of 9,375 acres. The northern most portion of the Howard Creek Unit is located within the Upper Sacramento River Region Boundary, along Butte Creek. Numerous bird, mammal, reptile, amphibian, and fish species are found seasonally or year round at all three units of Upper Butte Basin Wildlife Area.



Federal and State managed lands provide habitat for wildlife



1" = 3 miles

0 1 2 4 Miles

Datum: NAD 83 Projection: CA (Teale) Albers
Zone: N/A Units: meters
Sources: See Appendix for source citations

Regional Flood Management Planning

**Upper Sacramento River
Managed Environmental Lands**

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Prepared By: K. Miller
Date: May 10, 2013
File: Z:\Projects\109146\Map18_EnvLands.mxd

MAP 18A

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Map 18B – Managed Environmental Lands

This map shows the extent of lands that are currently being managed by federal, State, or private entities. The current mapped information is listed below:

- National Wildlife Refuge, USFWS, 2011.
 - Description from metadata: “This data layer depicts the simplified boundaries of lands and waters administered by the U.S. Fish and Wildlife Service (USFWS) in North America, U.S. Trust Territories and Possessions. It includes only lands that are held by fee or secondary title by USFWS. The primary source for this information is the USFWS Realty program.”
- Department of Fish & Game Lands, DFG, 2011.
 - This layer includes all of DFG (now Department of Fish and Wildlife) Owned and Operated Lands. These are only lands owned with fee title. The only lands shown on Map 13 are those designated as “Ecological Reserve” or “Wildlife Area”.
- The Nature Conservancy Lands, TNC, 2011.
 - Description from metadata: “A spatial dataset of lands and waters that The Nature Conservancy has a legal interest in (such as a conservation easement or fee-simple ownership). Includes spatial data from TNC’s Conservation Lands System (CLS) database, which is the legal database of record for all TNC land transactions (fee, easement, lease and deed restrictions).”

Mid-Sacramento River Region Managed Environmental Lands

Managed Land Type	Area (square miles)	Acres
National Wildlife Refuge (USFWS)	22	14,160
Department of Fish and Wildlife Lands	8	4,818
The Nature Conservancy Lands	1	721

Described managed lands are those lands located within the region or adjacent to the region.

Clear Lake Wildlife Area

Accessible only by boat, this area is one of the most significant bioregions of Lake County, comprised of a combination of oak covered hills, dense tule marsh, and an extensive riparian habitat system. This habitat mix provides for a wide diversity of aquatic and terrestrial species of wildlife including herons, red-tailed hawks, osprey, songbirds, waterfowl, deer, gray fox, bobcat, and coyote.

Collins Eddy Wildlife Area

The Collins Eddy Wildlife area has many different types of animal and plant species. The vegetation communities that exist in this area include riparian forest, woodland, scrub willow and oak woodlands. There are over 100 different species of birds, which include red-tailed hawks, Bullock’s oriole, horned lark, western kingbird and many more. The mammals in the area are the American beaver, black-tailed deer, gray fox, and northern river otter.

Colusa Bypass Wildlife Area

Managed by the California Department of Fish and Wildlife (CDFW), this 1,248 acre wildlife area is mostly grasslands. Several rows of willows and cottonwood trees line the eastern edge of the property. Excess water is diverted into the area from the Sacramento River during high flows in the

winter. The area provides a significant amount of cover for mammals and both resident and migratory birds. The Colusa Bypass Wildlife area is just outside the eastern border of the region.

Colusa National Wildlife Refuge

The 4,507-acre refuge primarily consists of intensively managed wetland impoundments, with some grassland and riparian habitat. Wetland impoundments are intensively managed to provide optimal habitat for the dense concentration of wintering waterfowl, as well as habitat for resident wildlife and spring/summer migrants.

The grassland habitat supports several populations of endangered and sensitive species of plants. The refuge is a stronghold for populations of the endangered palmate-bracted bird’s-beak and the threatened giant garter snake. About 35,000 visitors come to the refuge each year for wildlife viewing and 4,000 come to hunt waterfowl and pheasant.

Delevan National Wildlife Refuge

The Delevan National Wildlife Refuge is a 5,797-acre refuge approximately 80 miles north of Sacramento and consists of over 4,500 acres of intensively managed wetlands and 1,200 acres of uplands. The refuge supports several endangered plants and animals: giant garter snake, wintering peregrine falcon and bald eagle, breeding tricolored blackbird, and a large colony of the endangered palmate-bracted bird’s beak. Resident wildlife include grebe, heron, blackbird, beaver, muskrat, black tailed deer, and other species typical of upland and wetland habitats

Fremont Weir Wildlife Area

The Fremont Weir Wildlife Area, managed by the California Department of Fish and Wildlife, is located east of the Mid-Sacramento River Region boundary in the southern extent of the region. It consists of 1,461 acres of tall weedy vegetation, brush, valley oaks, willows, and cottonwood trees.

Sacramento National Wildlife Refuge

The Sacramento National Wildlife Refuge includes 10,819 acres of seasonal marsh, permanent ponds, and uplands. The refuge is located west of the region at the northern extent.

Sacramento River Wildlife Area

The Sacramento River Wildlife Area is 4,014 acres of riparian forest dominated by cottonwood, willow, ash, sycamore, box elder trees with dense understory of wild grape, pipevine, poison oak and grasslands, oxbow lakes, and gravel bars. The wildlife area is managed by CDFW for recreation such as fishing, bird watching, nature study, and trapping. Among the diversity of species that can be seen along the river are otters, beavers, gray fox, bobcat, western pond turtles, ash-throated flycatchers, great blue herons, egrets, and a variety of birds of prey.

Sutter Bypass Wildlife Area

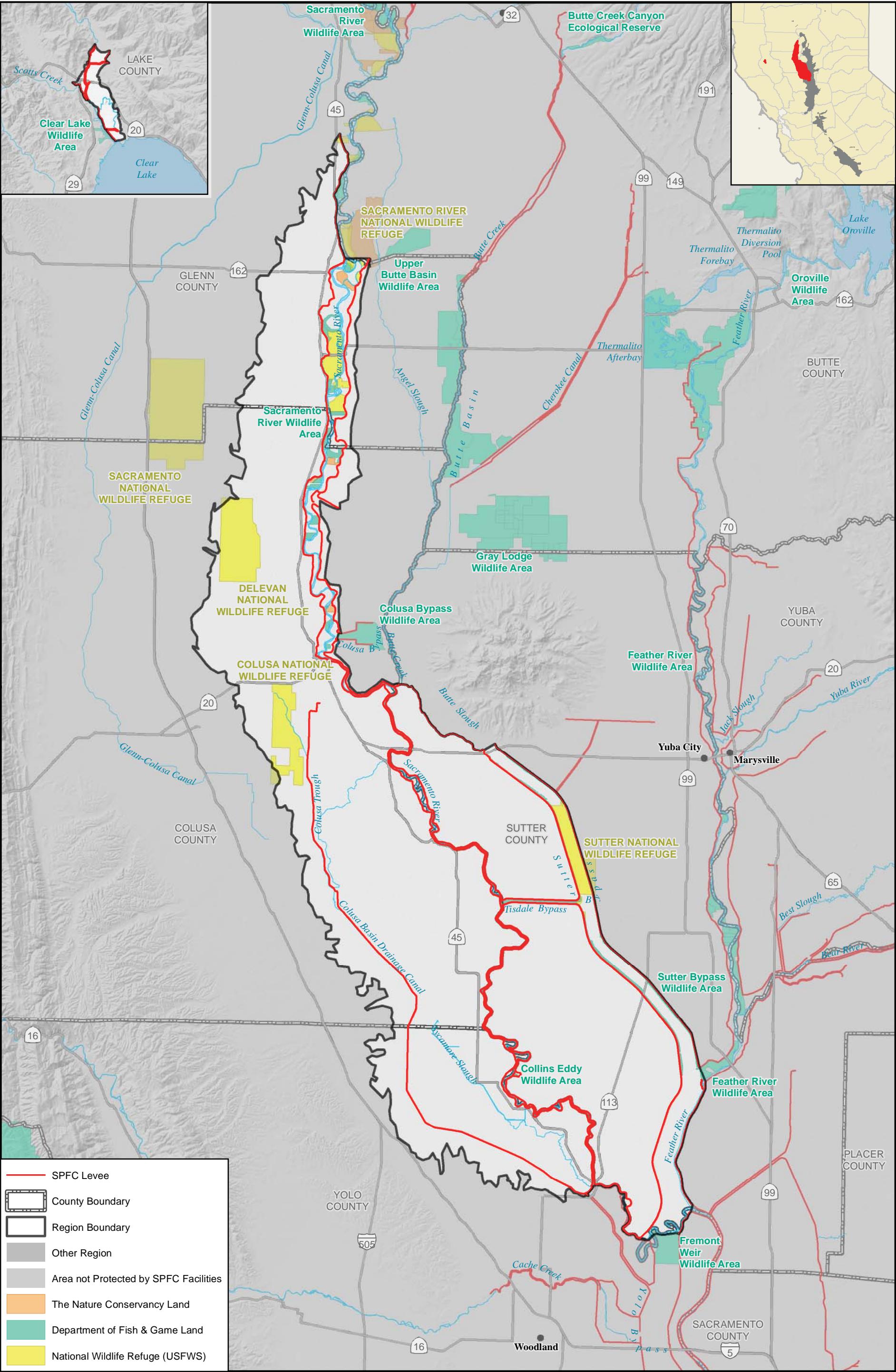
The Sutter Bypass Wildlife Area is managed by California Department of Fish and Wildlife for fishing, hunting, and wildlife viewing. It consists of the Tisdale Bypass and two long, narrow parcels on either side of the Sutter Bypass, for a total of 3,204 acres. The wildlife area is located just east of the region at the southern extent.

Sutter National Wildlife Refuge

The Sutter National Wildlife Refuge is about 2,600 acres consisting primarily of wetland impoundments with some riparian and grassland habitats. The refuge typically supports 175,000 ducks and 50,000 geese. The refuge is located within the Sutter Bypass east of the region.



Federal and State managed lands provide habitat for wildlife



Map 19A – Riparian Vegetation, Critical Habitat, and Endangered and Threatened Species

Riparian Vegetation

Riparian vegetation is a habitat type that is characterized by trees, other vegetation and physical features normally found on the stream banks and flood plains associated with streams, lakes, or other bodies of water. Riparian systems provide several important functions to both the aquatic and terrestrial ecosystems associated with them. These include, but are not limited to, stream bank stabilization, flow moderation and flood control, sediment control, organic matter necessary to support aquatic communities, water quality improvement by filtration, temperature moderation by shading, and stream structural diversity. Riparian habitats support a great diversity of wildlife, including sensitive invertebrates, amphibians, reptiles, birds, and mammals.

Riparian vegetation occurs throughout the Upper Sacramento River region. Within the Region, riparian vegetation is associated with the following waterways: Elder Creek, Deer Creek, Mud Creek, Sycamore Creek, and Butte Creek.

Designated Critical Habitat

Designated Critical habitat is a term defined in the Endangered Species Act and used by US Fish and Wildlife Service and the National Marine Fisheries Service. Designated Critical Habitat is a geographic area that is essential for the conservation and recovery of a federally threatened or endangered

species that requires special management and protection. It may include an area that is not currently occupied by the species but that will be needed for its recovery. Critical habitats are designated to ensure that actions authorized by federal agencies will not destroy or adversely modify critical habitat, thereby protecting areas necessary for the conservation of the species. Not all federally listed species have designated critical habitat.

Endangered and Threatened Species

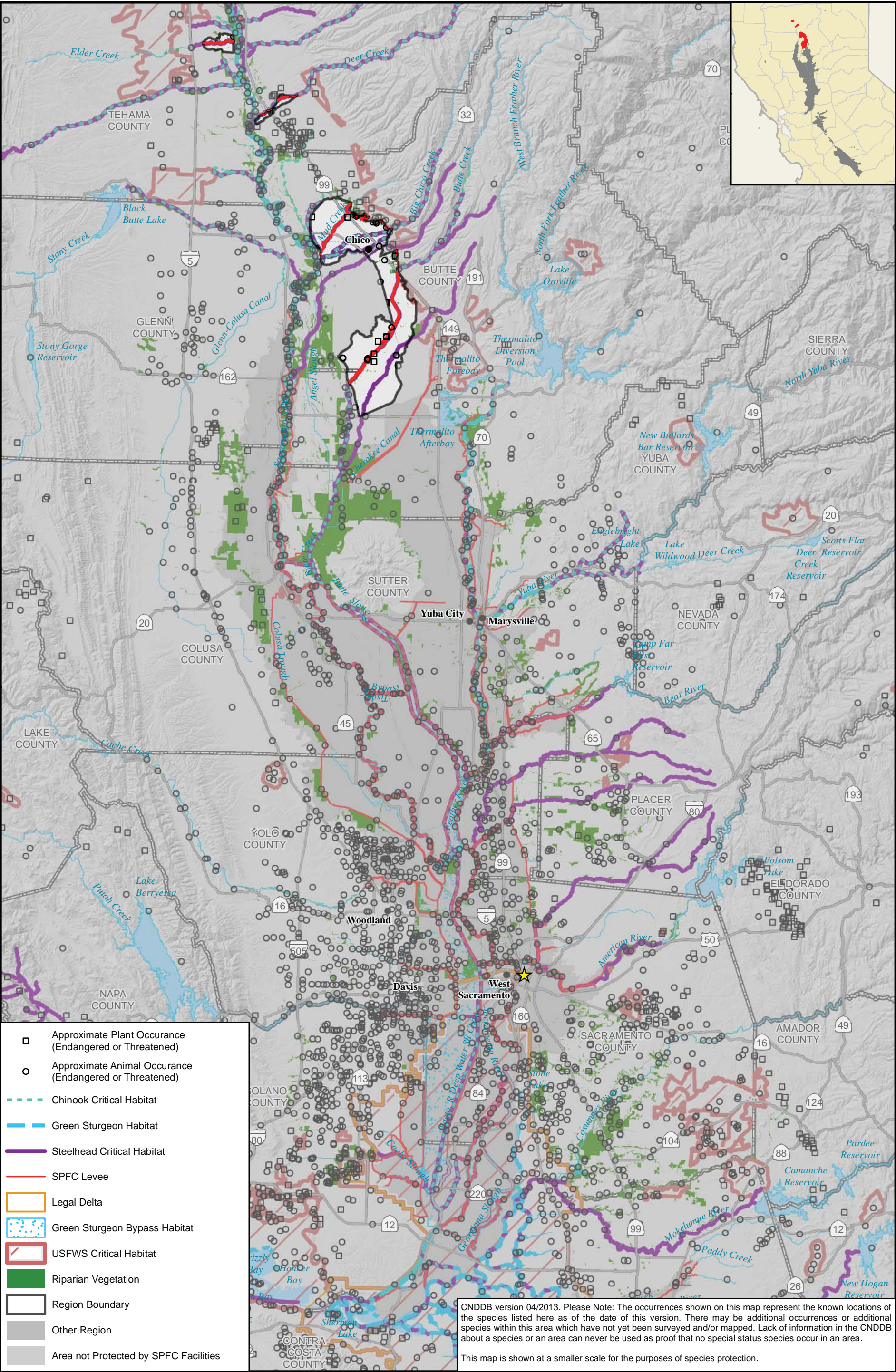
Critical habitat within the Upper Sacramento River region occurs intermittently throughout the region; however much of it is located outside of the Region Boundary. Critical habitat is designated for special-status plant and animal species endemic to vernal pools, swales and ephemeral drainages. The animal species with designated critical habitat in this region include: vernal pool tadpole shrimp (*Lepidurus packardii*), vernal pool fairy shrimp (*Branchinecta lynchi*), and Conservancy fairy shrimp (*Branchinecta conservatio*). Plant species with designated critical habitat in this region are: Greene’s tuctoria (*Tuctoria greenei*), Hoover’s spurge (*Chamaesyce hooveri*), slender Orcutt grass (*Orcuttia tenuis*), hairy Orcutt grass (*Orcuttia pilosa*), and Butte County meadow foam (*Limnanthes floccosa* ssp. *Californica*).

Critical habitat for the three fish species, the Green Sturgeon (*Acipenser medirostris*), the Central Valley steelhead (*Anadromous O. mykiss*) and the Central Valley Chinook salmon (*Oncorhynchus tshawytscha*) occur within the region.

Note: Endangered and Threatened species data shown are representative of occurrence areas defined by the California Natural Diversity Database.



Riparian vegetation provides for important ecosystem functions and enhances recreation



Map 19B – Riparian Vegetation, Critical Habitat, and Endangered and Threatened Species

Riparian Vegetation

Riparian vegetation is a habitat type that is characterized by trees, other vegetation and physical features normally found on the stream banks and flood plains associated with streams, lakes, or other bodies of water. Riparian systems provide several important functions to both the aquatic and terrestrial ecosystems associated with them. These include, but are not limited to, stream bank stabilization, flow moderation and flood control, sediment control, organic matter necessary to support aquatic communities, water quality improvement by filtration, temperature moderation by shading, and stream structural diversity. Riparian habitats support a great diversity of wildlife, including sensitive invertebrates, amphibians, reptiles, birds, and mammals.

The Mid-Sacramento River Region has areas of riparian, wetland, annual and perennial grassland, forbs and, evergreen and deciduous woodland.

Designated Critical Habitat

Designated Critical habitat is a term defined in the Endangered Species Act and used by US Fish and Wildlife Service and the National Marine Fisheries Service. Designated Critical Habitat is a geographic area that is essential for the conservation and recovery of a federally threatened or endangered species that requires special management and protection. It may include an area that is not currently occupied by the species but that will be needed for its recovery. Critical habitats are designated to ensure that actions authorized by federal agencies will not destroy or adversely modify critical habitat, thereby protecting areas necessary for the conservation of the species. Not all federally listed species have designated critical habitat.

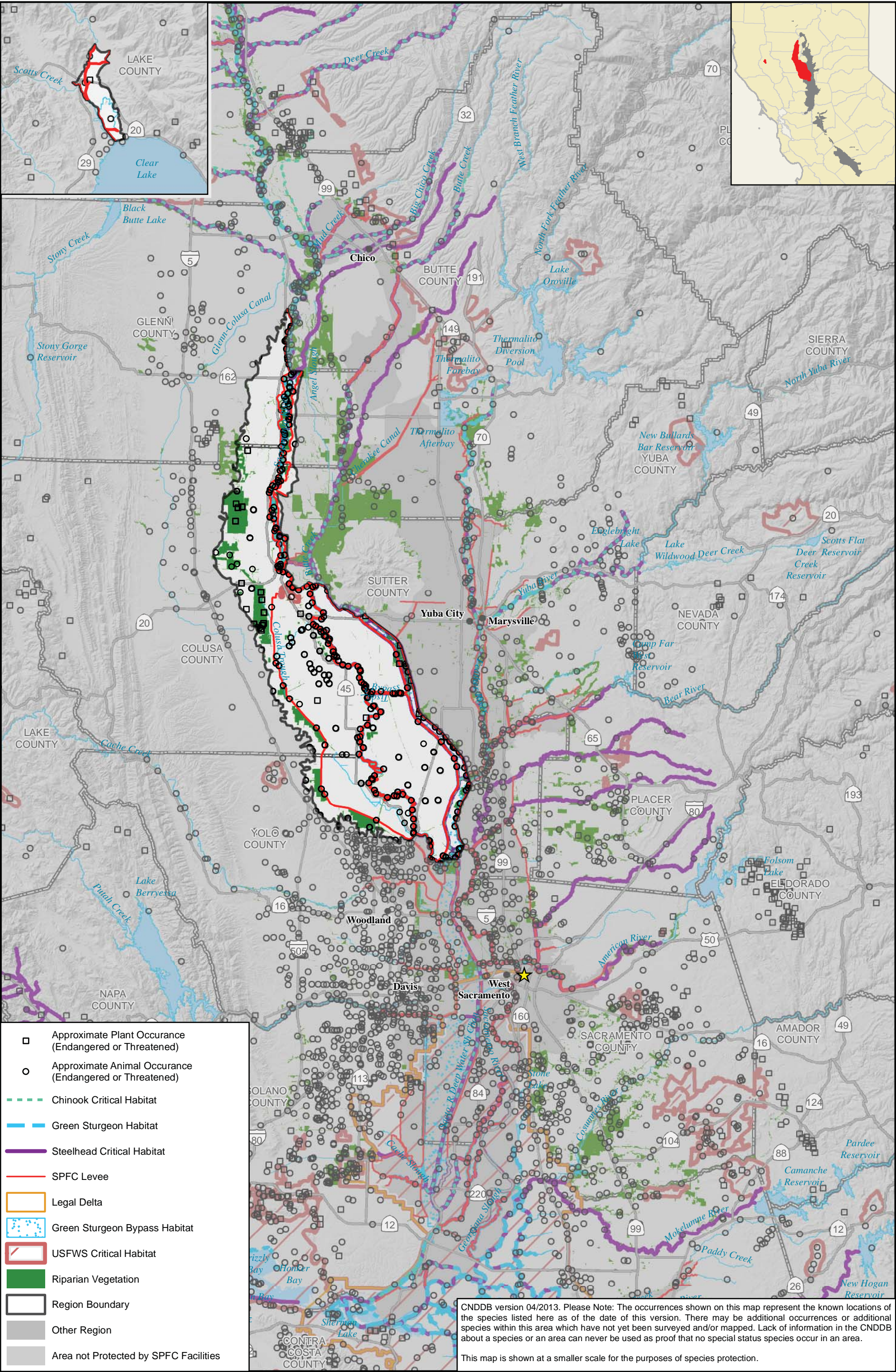
Endangered and Threatened Species

Species with land designated as critical habitat in the Mid-Sacramento include the Vernal pool fairy shrimp (*Brachinecta lynchi*), the Green sturgeon (*Acipenser medirostris*), the Central Valley steelhead (*Anadromous O. mykiss*) and the Central Valley Chinook salmon (*Oncorhynchus tshawytscha*) occur within the region.

Note: Endangered and Threatened species data shown are representative of occurrence areas defined by the California Natural Diversity Database.



Riparian vegetation provides for important ecosystem functions and enhances recreation



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Glossary

100-year flood event	The flood having a 1-in-100 (1 percent) chance of being equaled or exceeded in any given year. A structure located within a special flood hazard area shown on a National Flood Insurance Program map has a 26% chance of suffering flood damage during the term of a 30 year mortgage. <i>Federal Emergency Management Agency, http://www.fema.gov/, accessed February 2013</i>
200-year floodplain	An area that has a 1-in-200 (0.5 percent) chance of flooding in any given year, based on hydrological modeling and other engineering criteria accepted by the Department of Water Resources. <i>California Government Code Section 65300.2(a)</i>
conveyance capacity	The maximum rate of flowing water, usually expressed in cubic feet per second (cfs), that a river, canal, or bypass can carry without exceeding a threshold value such as flood discharge, or without using the freeboard distance from the top of a levee.
designated floodway	Means the channel of a stream and that portion of the adjoining flood plain required to reasonably provide for the construction of a project for passage of the design flood including the lands necessary for construction of project levees.
essential public facilities	Essential public facilities include, but not limited to, hospitals and health care facilities, emergency shelters, fire stations, emergency command centers, and emergency communications facilities. <i>California Government Code Section 65302</i>
flood basin	A bowl-shaped, natural landform that historically or presently receives and retains floodwaters, or an engineered floodwater detention basin, excavated below grade or surrounded by levees.
flood bypass	An engineered wide and shallow channel or confined floodplain, usually flanked by levees, that receives floodwaters to reduce the amount of flow in a river or stream.
flood corridor	A passageway for floodflows, including, but not limited to, bypass systems, channels, levee systems, floodplain easements, culverts, floodwalls, or a combination thereof.
floodway, State-designated	The channel of a stream and that portion of the adjoining floodplain required to reasonably provide for construction of a project for passage of the design flood, including the lands necessary for construction of project levee that are regulated by the Central Valley Flood Protection Board.
freeboard	Vertical distance from the normal water surface to the top of a confining wall.
integrated flood management	An approach to dealing with flood risk that recognizes the inter-connection of flood management actions within broader water resources management and land use planning; the value of co-ordinating across geographic and agency boundaries; the need to evaluate opportunities and potential impacts from a system perspective; and the importance of environmental stewardship and sustainability. <i>California Department of Water Resources, Draft FloodSAFE Strategic Plan, June 2008</i>
local jurisdiction	Means a city, city and county, or county.
Levee Flood Protection Zone	An area that is protected, as determined by the Central Valley Flood Protection Board or the Department of Water Resources, by a levee that is part of the facilities of the State Plan of Flood Control, as defined under Section 5096.805 of the Public Resources Code. <i>California Government Code Section 65300.2(b)</i>
maintaining agency	Maintaining agency means any city, county, district or other political subdivision of the State that is authorized to maintain levees. The California Department of Water Resources maintains levees pursuant to California Water Code Sections 8361 and 12878, but is not considered a maintaining agency.
non-project levee	Any levee that is not part of the State Plan of Flood Control (CWC 9602(c)) or other State-federal or local-federal flood protection facilities. Nonproject levees are typically privately owned or under the authority of a local levee district. ¹
non-SPFC levee	Any levee that is not part of the State Plan of Flood Control (CWC 9602(c)). This includes State-federal levees outside the Sacramento and San Joaquin river watersheds and levees within the Sacramento and San Joaquin river watersheds that do not have documented State assurances of nonfederal cooperation to the federal government or State responsibility identified in CWC Section 8361.
project levee	Any levee that is a facility of the State Plan of Flood Control. ¹ <i>California Water Code 9602 (c) California Water Code 9602 (c)</i>
riparian area	Riparian areas are transitional between terrestrial and aquatic ecosystems and are distinguished by gradients in biophysical conditions, ecological processes, and biota. They are areas through which surface and subsurface hydrology connect water bodies with their adjacent uplands. Riparian areas include portions of terrestrial ecosystems that significantly influence exchanges of energy and matter with aquatic ecosystems (i.e., a zone of influence). Riparian areas are adjacent to perennial, intermittent, and ephemeral streams, lakes, and estuarine-marine shorelines.

rural community	A city, town, or settlement outside of urban and urbanizing areas with an expected population of less than 10,000 within the next 10 years.
Sacramento-San Joaquin Drainage (SSJD) District	Comprises more than 1.9 million acres in the Central Valley generally along and adjacent to the Sacramento and San Joaquin rivers. SSJD District was created in 1913 by the California Legislature to allow survey work and the collection of data of the San Joaquin and Sacramento rivers and tributaries to prepare a report to the Central Valley Flood Protection Board to further the Board’s plans for controlling the floodwaters of the rivers, improve and preserve navigation, and the reclamation and protection of the lands that are susceptible to overflow from those rivers and their tributaries. The District’s management and control is vested in the Central Valley Flood Protection Board, and according to the Statute, the District can “acquire, own, hold, use, and enjoy any and all properties necessary for the purposes of the District.” <i>Central Valley Flood Protection Board, http://www.cvfpb.ca.gov/, accessed June 2009</i>
Sacramento-San Joaquin River Flood Management System	The Sacramento-San Joaquin River Flood Management System comprises all of the following: (a) The facilities of the State Plan of Flood Control as that plan may be amended by the Central Valley Flood Protection Board; (b) Any existing dam, levee, or other flood management facility that is not part of the State Plan of Flood Control if the board determines, upon recommendation of the department, that the facility does one or more of the following: (1) Provides significant systemwide benefits for managing flood risks within the Sacramento-San Joaquin Valley. (2) Includes project levees that protect a contiguous urban area of 10,000 or more residents within the Sacramento- San Joaquin Valley. <i>California Water Code Sections 9602 and 9611</i>
small community	Developed area with a population of less than 10,000.
State Plan of Flood Control	Means the state and federal flood control works, lands, programs, plans, policies, conditions, and mode of maintenance and operations of the Sacramento River Flood Control Project Described in Section 8350 of the California Water Code (CWC), and of flood control projects in the Sacramento River and San Joaquin River watersheds authorized pursuant to Article 2 (commencing with Section 12648) of Chapter 2 of Part 6 of Division 6 for which the Board or the Department has provided the assurances of nonfederal cooperation to the United States, and those facilities identified in CWC Section 8361. <i>California Water Code Section 9110 (f)</i>
State Plan of Flood Control Descriptive Document	The State Plan of Flood Control Descriptive Document is an inventory and description of the flood control projects and works (facilities), lands, programs, plans, conditions, and modes of operations and maintenance for the State-federal flood protection system in the Sacramento River and San Joaquin River watersheds and facilities identified in WC Section 8361. The document fulfills part of the legislative requirement expressed in CWC Section 9120 (a) and (b).
State Plan of Flood Control Planning Area	The State Plan of Flood Control (SPFC) Planning Area is the geographic area that includes the lands currently receiving flood damage reduction benefits from the SPFC. The SPFC Planning Area is completely contained within the Systemwide Planning Area.
urban area²	A developed area in which there are 10,000 residents or more. <i>California Government Code Section 65007 (j)</i>
urbanizing area	A developed area or an area outside a developed area that is planned or anticipated to have 10,000 residents or more within the next 10 years. <i>California Government Code Section 65007 (k)</i>
urban levee design criteria	Urban Levee Design Criteria (ULDC) means the levee and flood-wall design criteria developed by the California Department of Water Resources for providing the urban level of flood protection. <i>California Government Code Section 65007(k) and Water Code Section 9602(i)</i>
urban level of flood protection	Level of protection that is necessary to withstand flooding that has a 1-in-200 chance of occurring in any given year using criteria consistent with, or developed by, the Department of Water Resources. <i>California Government Code Section 65007(l) and Water Code Section 9602(i)</i>

¹Disclaimer: It is important for the reader to understand that a broader definition is often used to describe a project levee as any levee that has been implemented as part of a Federal project. For use with respect to the CVFPP, “project levee” is as defined in the Water Code.

²“Urban Area” is also defined in the California Public Resources Code Section 5096.805 (k) as “any contiguous area in which more than 10,000 residents are protected by project levees.” For use with respect to the Central Valley Flood Protection Plan, “project levee” is as defined in California Water Code Section 9602(c).



PUBLIC SAFETY

ENVIRONMENTAL STEWARDSHIP

ECONOMIC STABILITY

